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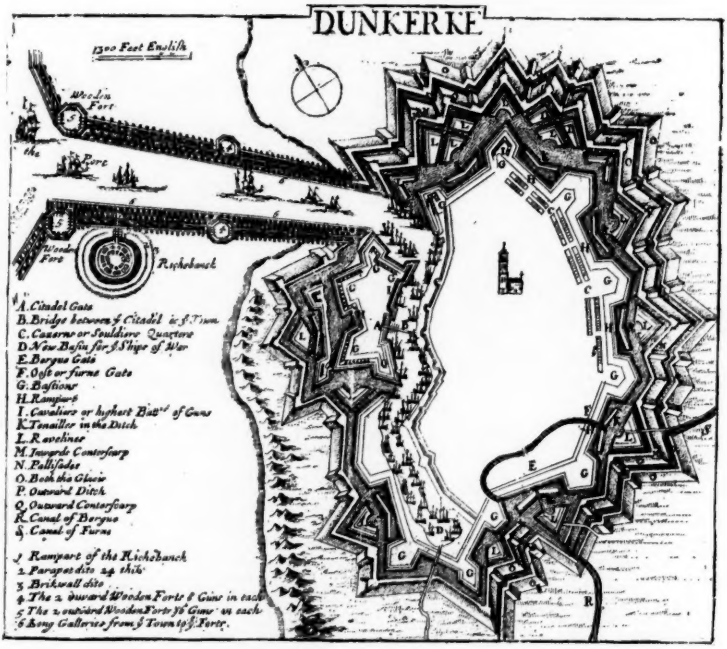
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ERRATUM—SEPTEMBER JOURNAL.

Page 1227, line 46, *for* "**Dufaure de Lajarte**" *read* "**Marin-Darbel.**"

THE JOURNAL
OF THE
ROYAL UNITED SERVICE INSTITUTION.

VOL. LIII. OCTOBER, 1909. No. 380.

[*Authors alone are responsible for the contents of their respective Papers.*]

SECRETARY'S NOTES.

I. OFFICERS JOINED.

The following Officers joined the Institution during the month of September:—

Captain F. J. W. Harvey, R.M.L.I.
Captain M. G. Heath, the Queen's Royal West Surrey Regiment.
Second-Lieutenant W. Walbeoffe-Wilson, 3rd Monmouthshire Regiment.
Lieutenant N. W. Benton, R.E.
Captain Hon. W. G. S. Cadogan, M.V.O., 10th Hussars.
Major C. R. Ballard, Norfolk Regiment.
Captain T. R. Badger, 12th Lancers.
Lieutenant A. F. St. C. Armitage, R.N.
Commander T. S. Price, Cape Colonial Division, R.N.V.R.
Lieutenant N. C. S. Simson, R.G.A.
Second-Lieutenant R. W. Russell, West Riding Regiment.
Lieutenant O. Wilkin, Devonshire Regiment.
Captain H. D. Belgrave, Royal West Kent Regiment.

II. ADDITIONS TO THE MUSEUM.

(6023.) A Snuff Box, taken from the pocket of a French Officer who fell at the battle of Vimiera, 21st August, 1808. The box bears the following inscription: "Liberté des Mers ésperance de tous les Peuples."—*Given by Major-General C. J. Horne.*

(6024.) A Water-colour Painting of "The Kwaja Pass, Afghanistan," showing the Force under Lieut.-General Sir Donald Stuart, 1878.—*Painted and Bequeathed by Lieut.-General Sir R. H. Sankey, K.C.B., R.E.*

(6025.) Shoulder-belt Plates of the 1st Royal Scots, 11th Foot, and 93rd Highlanders.—*Given by Lieut.-Colonel A. Leetham, F.S.A.* (*Curator*).

(6028.) A Print in Colours of the British Swiss Legion, 1854-1856.—*Given by the Viscount Dillon, F.S.A., Curator of the Tower of London.*

(6029.) Cavalry Sword and Scabbard, 1908 pattern.—*Given by the Secretary of State for War.*

(6030.) Small Oil Painting of a Trooper of the 2nd Life Guards, with a camp in the distance, executed about 1820.—*Given by Colonel R. Mackenzie-Holden.*

III. ARMY PROMOTION LECTURES.

A course of eight Lectures in Military History on "The Russo-Japanese War," set for the December Army Promotion Examination, will be given on the following dates, at 4 p.m., the Lecturer being Mr. J. H. Anderson, F.R. Hist. Soc., Barrister-at-Law:—Tuesday, 9th November; Friday, 12th November; Tuesday, 16th November; Friday, 19th November; Tuesday, 23rd November; Friday, 26th November; Tuesday, 30th November; Friday, 3rd December.

The fee for the course of Lectures is one guinea for members of the Institution and two guineas for non-members.

Application to attend, enclosing the fee, to be addressed to the Secretary, Royal United Service Institution, Whitehall, S.W.

IV. LECTURES.

The Right Honourable Viscount Midleton will preside at the Lecture on 1st December:—"The Army as a Profession," by Major A. B. N. Churchill.

V. GOLD MEDAL ESSAY.

Officers who are competing for the 1909 Gold Medal are reminded that all essays must be received not later than 30th November.

VI. CHANGE OF ADDRESS OR RANK.

Notification of change of address or rank must reach this Office not later than the 7th of the month for correction for the following JOURNAL. Members are reminded that it is essential that such changes should be made in writing; if these changes are not notified, members will themselves be responsible if their JOURNAL fails to reach them through being wrongly addressed.

VII. ADMISSION TO LECTURES.

Members are reminded that they are able to introduce only two visitors to each Lecture. When the member does not attend himself, it is necessary that visitors should hand in his visiting card at the entrance.

THE PRESENT CONDITION OF SUBMARINE BOATS.

Translated from *Nauticus*, 1908, and reproduced by permission of the Editor of that Periodical.

Communicated by the Director of Naval Intelligence.

I. Introduction.

DURING the course of the last two years a substantial advance is to be noticed in the domain of the submarine, in that all the countries actively engaged in its development appear to have arrived at a certain conclusion. To-day there is a greater unanimity of opinion noticeable than was the case in 1906. There is a clearer conception as to what tasks fall to the new weapon, and how far these tasks, in the present condition of the industry, can be fulfilled and extended.

With sound uninfluenced development the final results must be approximately the same; there is evidence of this in the greater similarity of the modern types of individual countries in comparison with those of previous years. Utopians must postpone their ideas of an entire revolution in the domain of naval war and fleet politics to a later date. On the other hand, however, the new weapon has gained for itself friends amongst those who had hitherto looked on it with scepticism.

The experimental period may now be considered as finally left behind. The construction of a submarine is a compromise, as is that of every other war-vessel; the mutual dependence of individual factors is recognised, and consequently the individual peculiarities of the boats can be developed in a logical manner.

A further remarkable phenomenon of recent years is that the cloud of secrecy, which formerly surrounded the submarine-boat policy of the leading countries, has now been lifted to a considerable extent. This is principally due to the great interest taken by private firms in the building of submarines; by attracting suitable men and by experiments these firms soon arrived at results similar to those already obtained by the naval Powers. In America, the construction of submarines has

always been in the hands of private firms (Electric Boat Co., Holland, Lake); in France and Italy, Chief Constructors Laubeuf and Laurenti, who were formerly in the service of the Government, have gone over to private firms; in Austria the firm of Whitehead have set up a submarine-boat yard at Fiume, in which Vickers also has a share. Since this latter firm, in conjunction with the Government, has quite recently been engaged in the development of English submarines, the results also of this new undertaking cannot but be influenced by English ideas.

The above-mentioned circumstances now permit those countries who have hitherto stood aloof from the submarine question to engage in the construction of such vessels without the danger of initial failure; they are, in fact, in a position to fix certain definite conditions, according to the special needs of each country, which the boat ordered must satisfy. Considerable use has recently been made of this possibility, namely, by Austria, Sweden, Norway, and Denmark; Turkey also intends to place orders with private firms.

To-day the submarine-boat finds a place in nearly every Navy —not as an experiment, but as a justified part of the national naval armament.

II. The Question of Type.

The progressive knowledge which has led to the introduction of the submarine as a weapon to be reckoned with in war has also brought with it a remarkable standardisation of its details of construction. The groping uncertainty evinced in the trial types of former (especially French) building programmes has given place to a logical development, which may be proved to exist not only within individual Navies, but also in the Navies of the world as a whole.

Certainly, the submarine is not at present such a thrashed-out conception as the battleship or cruiser. The levelling course of development, however, has already advanced so far that to-day the distinction, formerly considered fundamental, between the submersible and the submarine need scarcely be made; indeed, it is no longer possible to do so, partly by reason of the fact that owing to the disappearance of the differences, individual boats can no longer be assigned straight off to one of the two original types.

Fusion of the "Submersible" and the "Submarine."

The modern submarine—formerly purely cylindrical in section, with little or no outside constructions—has an extensive superstructure, which gives it better lines for surface work and increased seaworthiness and stability, in consequence of the alteration in form. At the same time, the reserve of buoyancy, *i.e.*, the buoyancy of the boat when on the surface, has been

increased, as is shown in the following table, and approximates to that generally assigned to submersibles:—

Class.	Launched.	Reserve of Buoyancy.	
Naïade (French)	1901 ...	5 per cent.	Submarines.
A Class (English)	1902 ...	10 „ „	
B Class (English)	1904 ...	11 „ „	
Émeraude (French)	1906 ...	13 „ „	
Octopus (American)	1906 ..	15 „ „	
Normal Submersibles	— ...	20 – 25 per cent.	

As characteristic of the submersible, there only remains, therefore, the stowing of the fuel and ballast tanks in the outer body instead of, as in the submarine, in the inner body. This distinction is also beginning to disappear, especially as now there are designs which, while placing the hot oil tank in the inner body, leave the ballast tanks wholly or partly outside, thus effecting a compromise. It may be confidently expected that in this respect also the submarine will in a measureable time adapt itself to the submersible, and thus be completely fused with it into one type. A further possibility certainly is that the inner and outer bodies will be successfully united, a ship-like shape given to the whole, and the superstructure correspondingly limited. Perhaps Italian submarine-boat building, which, as is general in other forms of ship-construction, likes to go its own way, is destined to be the pioneer in this respect. The Fiat Works at Spezia are now building for Italy boats with oval hulls, which, owing to a specially patented construction, are said to be capable of resisting water pressure at a depth of 130 feet. Of course, this does not in any way alter the fact that the circular form otherwise generally employed is best for resisting pressure in all circumstances; but it is nevertheless not impossible that the necessary rigidity may be obtained in an oval hull by suitable stiffening. A boat so formed is economical as regards space in the arrangement of the engines, etc., and makes possible considerably better lines. The measurements of this Fiat boat are: length, 139·4 feet; breadth, 17 feet; depth, 6·9 feet. Such a boat cannot be placed in either of the former principal classes.

In the following pages, where it is exclusively a question of considering the most modern constructions, mention will, for the reasons given, only be made of submarines of the type that momentarily governs the new building programmes of all nations, *i.e.*, of the large high-sea boat capable of making long voyages and possessing an extensive radius of action from its

base. The coastal boat and the stowable boat are nearing their end; they are, as hitherto constructed, the products of a period now passed. Perhaps it is reserved to a later period and a further advanced technique to again call them into existence.

The newest Types of high-sea Submarines.

The present-day submarines of all countries exemplify with great unanimity the peculiarities which were laid down in the 1906 *Nauticus* as characteristic of the submersible, and which have been once more explained above. In addition to Italy, England, America, and, following England, Japan, are farthest from this type. The explanation lies in the course which development in submarine building has taken in these countries.

English Types.

England considered her submarines almost entirely as a complement to, or substitute for, the mine fields before her ports. The great disadvantage that contact mines have for England is that in the strong Channel currents they may easily be torn away from their moorings, and, being driven about by the tides, may be fatal to shipping during war and indeed long after. The Holland boat, which in a medium form was very suitable for the narrowest harbour defence, was chosen. An agreement with Vickers, lasting till 1907, held England fast to this type, from which the A B, and C classes were developed while retaining all its fundamental qualities.

These classes, however, show distinctly traces of the transition from the purely submarine-boat to the submersible, as shown above. This may be even more noticeable in the boats of the D class (particulars of which are not known), constructed after the lapse of the Vickers-Holland agreement.

American Types.

Submarines have not undergone any regular development in the United States of America. Here the two principal inventors, Holland and Lake, have constructed their boats, which were originally similar, on widely different lines. A fusion of the two types would have given a boat fairly similar to that which we recognise in the majority of other countries as the modern submarine. For this purpose, however, pressure would have been necessary on the part of the Government as the chief customer. This was wanting; instead, the Government undertook comparative trials in as impartial a manner as possible; these ended in the summer of 1907 in favour of Holland. It thus comes about that America, in its latest programme, provides for boats similar to the older English ones. In the meantime Lake has accepted the challenge to build a new rival boat. If he is successful with it, then America will forsake her present

position and fall into line with the rest of the naval Powers; if, on the other hand, Lake fails, her falling into line will be somewhat deferred, but in spite of that will scarcely be prevented.

Italian Types—High-sea and Coastal Types.

With regard to the Italian types, everything necessary has been said above.

The principal characteristics which to-day are emphasised by all States in submarines are:—

Seaworthiness.
Large radius of action.
High surface and under-water speed.

All these demands tend to increase the displacement, as may be seen on almost every side. With advancing development in this direction a time will certainly arrive when it will be necessary to create a new type of smaller coastal submarines. The high-sea boats will become too unwieldy for use in coastal waters; the question of cost will also exercise a similar influence. At present, however, as mentioned above, all countries are fully occupied in creating a useful high-sea boat, which is recognised as the chief need. France and England, the countries having the principal submarine flotillas, obtain from former stages of their development small boats suitable for coast defence. In France the need of this division is recognised and is being thoroughly discussed in the Chamber. However, the need for such a special class does not appear to be generally recognised at present.

III. Displacement and Speed.

Displacement.

In their latest designs most of the larger Navies—those of England, France and Russia—are having an under-water displacement of between 500 and 600 tons. France exceeds this size in some of her experimental boats of the 1906 programme. America may attain this figure with her enlarged *Octopus* type boat on order, and also with the projected *Lake* boat. Italy contents herself with a considerably smaller boat, viz., one of 200 tons, in the hope of obtaining with it, by technical improvements, results equal to those obtained by other nations.

Attention must here again be called to the already-mentioned favourable shape of the Italian boat, to the fact that benzine motors are still to be used, and to the submerged speed required, which is only 8 knots. These points allow a considerable saving in weight and space. The same arrangement suitable for a benzine engine of 500-H.P. would, if heavy oil

were used, only allow the installation of an engine of approximately 300-H.P. The low submerged speed allows a saving in the accumulator plant, which is by far the greatest weight carried in submarines.

A prudent and systematic advance is advocated in the direction of increased displacement and submerged speed, in order to avoid unpleasant surprises in the management of the boat, and especially in that of the diving mechanism and the submerged steering gear. This increase finds its limit in the length of the boat, which increases with the displacement, and which is accompanied by the danger of grounding in shallow water. The perfecting of the submerged steering gear will always extend this limit. A further limit is imposed, however, by the necessity of adapting the displacement to the condition of the motor industry, which is not yet in the position to construct reliable engines of any given size in the compact form here necessary. France gets over the difficulty by the extensive use of steam engines, but in doing so has to accept other important disadvantages. No other naval Power has, up to the present, followed her example. Finally only a limited number of bow and stern tubes can be advantageously fitted in a submarine, of which those in the stern cannot be considered of the same value as those in the bow. it is also to be expected that later on the question of expense will put a limit to the increase of displacement for a class of ship whose receptive capacity for armament cannot be increased in a measure corresponding to her size and cost. Moreover, in view of the low speed of submarines and the limited possibility of planned co-operation, every undertaking demands a large number of boats in order to compensate for the insufficiencies of each unit. By the construction of new firing arrangements and by an improved technical development of the boat itself, these objections to an increase of displacement could of course be overcome.

Speed.

Speed stands in a close relationship to displacement; the limits are set by the same factors—length, motors and the capacity of the accumulators. While the old English Holland boats had a proportion of length to breadth of 5 to 1, almost all modern types go to 10 to 1 and more.

The endeavour to-day is principally to increase the surface speed, and the utmost limit attainable at present is generally accepted as 15 knots. This might be taken as a proof that the Powers are basing their designs on strategical requirements, making coast defence in its narrowest sense a secondary consideration. In a certain measure this is indeed the case, as may be seen from the increase in displacement and in radius of action. Partly, however, the great attention paid to submerged speed is a consequence of the lines on which technical develop-

ment has taken place, this being more favourable to surface than to submerged speed. Motors are to-day making rapid progress towards ultimate perfection, while the development of greater capacity in the accumulators has proceeded at a considerably slower pace. Advances have, however, been made in this domain which have made a submerged speed of about 10 knots attainable. The importance of submerged speed tactically is everywhere clearly recognised. It will be especially in evidence when a really practicable means of defence against submarines has been discovered. A substantial increase in the submerged speed will only be attained when a standard motor is invented, *i.e.*, a thermal engine that can also be used under water.

IV. The Motor Question.

Although it could be easily shown that from a shipbuilding point of view there is recognisable to-day a considerable measure of agreement in all new designs, such is by no means the case with regard to the means of propulsion. This results from the fact that the great difficulties of submarine-boat construction lie in this direction, difficulties that individual constructors now seek to overcome on quite dissimilar lines. Here too, however, development has proceeded far enough to allow the lines to be seen with some certainty upon which in measurable time the majority of types will be developed. The motors for surface and submerged propulsion must be still kept distinct and dealt with separately. The attempts to create a standard motor for both methods of propulsion, which will be further treated of below, must be considered as abortive for the present. In consideration of the great advantages to be hereby attained, similar attempts will undoubtedly be again undertaken and continued. As science has hitherto been ultimately equal to every task set before it, we may at a later date find in the standard motor the typical engine for all submarines; it would, however, be premature to-day to attempt to forecast its probable form.

Surface Motors.

The requirements of an engine suitable for surface propulsion are naturally the same everywhere:—

1. Small weight and small space requirements.
2. High total capacity.
3. High number of revolutions. This is necessary in order that when employing it together with dynamos, which are always necessary to charge the accumulators, it may not be necessary to give these dynamos too large dimensions.

   On the other hand, the number of revolutions must not be so large that when the motor is coupled

directly to the propeller the efficiency of the latter is largely decreased.

4. Reversibility and ease of control.
5. Low consumption of fuel.
6. Safety in working.
7. Noiseless movement.

The majority of the above demands can best be met by the use of combustion motors.[1] In making a comparison with the steam engine full value must be assigned to the fact that these motors are in a state of rapid and continuous development, and that extensive improvements in every respect may be expected in the future. The fuel chosen for combustion motors is the cause of their principal variations in design. Motors burning light fuels—benzine, benzol, gasoline, alcohol—compare favourably in every respect, *with the exception of safety when running*, with those burning heavier fuels, such as petroleum and paraffin oil. For stationary engines and for surface vessels, therefore, only the former are generally considered. In submarine-boat propulsion, on the other hand, the numerous accidents that have happened have increasingly led to the disuse of these engines. Heavy oil motors, and to some extent steam engines, have taken their place.

Apart from steam engines, Diesel motors (using fuel of every kind), Körting motors (using petroleum), as well as various kinds of gasoline motors, momentarily dominate submarine boat building. *Nauticus* for 1904 and 1906 contains a description of these types. How far changes have taken place since is seen from the observations below.

Thornycroft has recently constructed a petroleum motor for the Italian Navy (see page 1282). The English heavy oil motor by Gardener has proved useless for submarine boats.

1. *Weight and Space Requirements.*

The great advantage of combustion motors in comparison with every other sort of engine is shown by the weight requirement figures, as well as by the great improvement in the former which has taken place in the course of a few years:—

Type.	Weight per H.P. for a capacity of about 200 H.P.
Diesel, old	52 kg. (114·6 lbs.)
„ modern	32-35 kg. (70·5 to 77·1 lbs.)
Körting, old	26 kg. (57·3 lbs.)
„ modern	23 kg. (50·7 lbs.)
Gasoline engines of various types	About 15 kg. (33 lbs.)
Steam Engines	„ 50 kg. (110·2 lbs.)

[1] For the sake of simplicity in the subsequent text combustion and explosion motors are included under the former designation.

It may be mentioned here that the French motor-boat industry has already succeeded in reducing the weight of the engine to 2·2 lbs. to 3·3 lbs. per H.P.

Space requirements also favour the combustion motor as against the steam engine, since with the former the boiler room is entirely dispensed with. The size of the motor, however, increases greatly with an increase of power, since the latter must be attained not by enlarging the cylinders but by increasing their number.

2. *High Total Capacity.*

An increase of the engine capacity is prevented by the fact that the power that can be obtained from one cylinder is limited. In submarines about 50-H.P. is the highest power that one cylinder can develop. A further enlargement of the cylinder causes a degree of heat that is unbearable with the water-cooler available. One remedy, which, however, entails even greater disadvantages, would be the reduction of the working pressure or the number of the explosions, *i.e.*, of the revolutions. The greatest known performance is that of a French de Forest engine of 850-H.P. with 18 cylinders. These are placed in three groups at intervals of 120° around the propeller shaft, and require, therefore, such space as can only be obtained in submarines with difficulty, and in all circumstances allow the use of but one propeller.

It appears, however, that in a measurable time science will overcome this disadvantage within the limits applicable to submarines. A useful alternative is now afforded by the division of the engine capacity on to two, lately even three, propeller shafts.

3. *High Number of Revolutions.*

The most favourable and most suitable average number of revolutions, both for propellers and dynamos, is 600—650. A method of influencing the revolutions for one of the two ways of working consists in the insertion of cogwheel transmission gear, but this cannot be done in large engines. Other arrangements are now generally employed for speed regulation, as described in the next paragraph.

4. *Reversibility and Speed Control.*

Two methods of reversing often employed formerly are to-day scarcely worth consideration, in consequence of the increase of the power of the engine; these are adjustable propeller blades and reversing by the introduction of change gear into the propeller shaft, which permit the propeller to revolve in the opposite direction to the motor. The first-named process also allows a variation of the power of the engine, but is

uneconomical in so far as the efficiency of a propeller of that sort is not high. The use of change gear has the disadvantage that it can only be used for reversing and not for regulating the speed of the engine. A combustion engine can further be reversed by compressed air. This method is, however, less reliable than the above, and is, moreover, considerably more complicated. Since every stroke of the engine implies the presence of compressed air, a compressor, driven by a special engine, must be used. In addition, air reservoirs and leads are necessary. A compressed air installation always limits the number of engine movements, the limit to which is set by the consumption of the quantity of air available. It is to be remarked that to reverse engines in a boat under way, air under very considerable pressure is required to overcome the current caused by her motion.

Modern installations make use of a combination of the existing motor and electric power for reversing and for controlling the speed. Motors with a very high number of revolutions maintain electrical transmission between motor and propeller. The motor drives a fast running current generator, and this actuates the slow running electric motor placed on the propeller shaft. Such an arrangement allows of any desired control of the direction of motion and the power of the engine. A loss of energy of about 15 per cent. of the capacity of the motor naturally results from the transmission. In spite of this, however, such a system may be more economical than direct drive at a high number of revolutions. At low speeds the accumulators take up that part of the engine's capacity not used in propelling the boat; moreover, such an installation permits the electric motors and accumulators to be combined in driving the propeller, and thus concentrates the whole of the power. When a power of 850-H.P. with 12 cylinders and one propeller is mentioned for the English B Class boats, when running on the surface, these figures probably represent a similarly arranged concentration of the whole energy available in the boat. Of course, as a rule, such a procedure is prohibited, as the electric power necessary for running submerged is thereby lost. This indirect arrangement allows of a rational use of the engines, inasmuch as, according to demand, the whole of the dynamos, a few of them, or even only one, can be utilised to drive the propeller motors. The dynamos not in use are either stopped or utilised for charging the accumulators. Such an installation gives great security from breakdowns.

With slower running motors the arrangement of the engine according to the del Proposto system is more advantageous. Upon the propeller shaft there is a dynamo in front, behind that a motor, and finally an electric motor. Between the two latter an electric coupling is inserted. When steaming at full speed on the surface this coupling is fast, the motor drives the propeller direct, the dynamo and electric motor running free

without current. In manœuvring the coupling is detached, and the dynamo and electric motor set in motion; the working is then the same as described above for the indirect system; the motor actuates the dynamo, and this the electric motor with the propeller; the direct connection between motor and propeller is interrupted.

The Diesel motor cannot be reversed, but its speed can be regulated to a certain extent by altering the quantity of fuel forced into the cylinder with every stroke of the piston.

Every combustion engine requires for starting either the electric energy present in the accumulators or compressed air. Heavy oil engines must generally first be started with a lighter fuel, before the heavier oil vaporises and can be used. The only exceptions are the Diesel and Körting motors. With the former there is generally no vaporisation, with the latter the electric current furnishes the heat necessary for vaporisation.

5. *Small Consumption of Fuel.*

Except in steam engines, the weight of the fuel used is greatest with heavy oil motors. They use about 400 grammes (14·1 ozs.) of oil per H.P. per hour. The gasoline motor uses between 200 (7·05 ozs.) and 300 grammes (10·58 ozs.) for the same performance. The Diesel motor, with about 200 grammes (7·05 ozs.) of petroleum, uses the least fuel, thus compensating for its great weight. The steam engine, in addition to being of great weight, consumes the most fuel; it needs from 500 to 550 grammes (17·6 to 19·3 ozs.) of fuel oil (Mazout) per H.P. per hour.

6. *Safety when Running.*

As regards combustion motors the safety depends materially on the sort of fuel used. Only the fuel which does not give off gas in the temperature which occurs in submarine-boats can be considered safe. Small leakages must always be reckoned upon when oil is employed. Every oil that gives off gas at the inside temperature of the boat forms, together with the air, the same explosive mixture which is used inside the engine, and makes an explosion possible any moment. The naval Powers interested are consequently more and more inclined to give up gasoline and benzine motors in favour of the heavier petroleum motors; they are willing to put up with the greater weight of the engine and the need of more space. In cases where, in spite of all, the former engine types have been adhered to, the reason has been partly that the greater power has been placed in the foreground as the determining factor, and partly that the home industry of the countries concerned has not yet succeeded in creating a serviceable heavy oil motor. In England an attempt was made to meet the dangers connected with the employment of gasoline engines by the use of white

mice, which are very sensitive to gasoline fumes, and from whose conduct it is, therefore, easy to know when leakages occur. In view of the great number of serious explosions which can be traced to the use of extremely volatile oil, the greater confidence of the crew of boats with heavy-oil engines will in any case prove a military advantage that may practically counterbalance the military disadvantage of these engines.

7. *Noiseless Action.*

The demand for noiseless running is still hardly met at all when employing combustion motors. The limited space prevents the use of efficient silencing arrangements. The sound of the exhaust gases issuing from the cylinders is, however, by no means so noticeable outside as would be expected from the noise in the engine room.

8. *More Recent Types of Surface Motors.*

Beside the motors which have been discussed in former *Nauticus*, there are in course of development more recent types, which show a relationship with the Diesel motor, but which at present have not matured to practical utility. A quick-running Diesel motor has recently been completed in the United Engine Factories, in Augsburg, which, with four four-cycle cylinders, develops 300-H.P. at 400 revolutions. Its weight of over 10 tons still gives an engine weight of 37 kilogrammes (81·6 lbs.) per H.P. It was proved at the trial that the capacity of this motor can be increased to 400-H.P. at 500 revolutions. With these figures the weight per H.P. is decreased to 25 kilogrammes (55·1 lbs.). As this figure is not obtained with the normal power of the engine, it has not been inserted in the table of weights on p. 1278. The H.P. can be varied from 100 to 400 at 250 to 500 revolutions, and with a consumption of oil between 180 and 220 grammes (6·1 and 7·8 ozs.). The above motor has been primarily constructed for use in an open vessel. If, however, in spite of the size of the cylinder (1 cylinder = 75- to 100-H.P.) it is possible to master the difficulties of cooling in a satisfactory manner, this type will be very useful for submarines.

The first English heavy oil motor has lately been designed; it is being constructed by Thornycroft and is intended for the Italian submarines *Otaria* and *Tricheco*. It is started by compressed air, gasoline being then used, and finally petroleum; it is said to be reversible; four are being made, each of 350-H.P.

Steam Engines.

Steam engines are only used at the present moment in France, where many trials have already been carried out with them.

After the failure of the benzol motor in the *Naïade* class, France adopted the Diesel type as a result of the Paris Exhibition of 1900, where the Diesel motor was exhibited. Engines of this kind, however, built in France, were not at first satisfactory. The result was the introduction of the steam engine, to a great extent.

Disadvantages of steam engines, as compared with combustion engines, are greater demands on weight and space; on account of the greater space occupied, there is an extended heating of the interior of the boat. Further, the consumption of fuel is greater, and continues when the engine is stopped. Fresh water must be carried to feed the boiler; the engine must be heated in order to run. The advantages are unlimited, viz., possibilities of regulating and reversing (employing reciprocating engines), reliability, possibility of constructing them in any size required; moreover, the staff is generally better acquainted with the steam engine, and the cost is smaller.

France originally provided two triple expansion engines of 350-H.P. each for the first series of the *Pluviôse* class (Q. 51—69). The results obtained to date are most satisfactory. In spite of that, at the last moment, at the beginning of 1908, combustion motors have been ordered to be used for Q. 67—69. Some of the four trial boats of 1906 are, it is said, to be provided with steam engines. In the meantime the Diesel motors of the *Emeraude* and *Opale* have given most satisfactory results on their trial trips. The other boats of the same year (Q. 70—89) are, therefore, to receive engines of this type. According to this it appears that the latter type and steam engines are generally considered as of equal value. For the 1907 boats (Q. 90—99) steam engines have been mentioned.

Under-water Motors.

Electric motors, supplied with current from accumulators, are still generally employed as under-water motors. The increase to about 10 knots of the submerged speed hitherto attained was made possible by the increase of displacement and the enlargement of the accumulator plant, and in a smaller degree by technical improvements in the accumulators.

Standard Motors.

A material increase in the submerged speed is probably only to be expected when the attempts to construct a standard motor for submerged and surface work have been successful. Practical trials in this direction have hitherto only been made in France. *Y* and *Omega* were to have travelled submerged and on the surface with petrol motors, but these attempts have been so far unsuccessful. The same was intended for the *Guêpe* class, the construction of which, however, has been given up

altogether. At present it is stated that one of the four trial boats (Q. 89) is to have a steam engine as a standard motor.

V. Diving Apparatus.

The basis of all diving apparatus now in use is the presence of a certain amount of reserve buoyancy which must be overcome by the diving rudders. Every boat must, therefore, be under way in order to dive and remain under water; if she stops, then she comes to the surface automatically. In order to dive on the spot, trials have been made with vertical propellers, which, however, have not found a very general acceptance. The new Italian boats, which have been mentioned several times, are alone fitted with these propellers. Lake was aiming at the same object when he anchored his boat in certain depths by bow and stern anchors. In strong currents, however, it is doubtful whether this method is free from objection.

The present customary diving arrangements under way fall under two principal heads. One giving the boat an inclination during the dive, and one carrying out every alteration of depth on an even keel.

Diving with an inclination of the Boat.

One type of apparatus, consisting of a pair of horizontal stern rudders, is principally found in all English boats. It demands a very small amount of reserve buoyancy (A Class: 1/800 of the tonnage), and gives the boat gradually a sharp inclination of 10—12°; and in some circumstances, if by faulty trimming or through the roughness of the water the stern protrudes, it fails.

An improvement on this method is the fitting of two pairs of diving rudders, on bow and stern, and the enlargement of the blades of the rudders. In this case the rudders work twice: they first give the boat a dip, then they press it directly under the surface on account of the pressure of the water on the large blades produced by the motion of the boat. Correct handling is a matter for the commanding officer, who sets one pair of rudders as circumstances demand, while the helmsman works the other pair, continually altering their position. In this case the inclinations are considerably smaller, and a failure is impossible, since the forward rudders are sure to be in the water.

Diving on an even Keel.

The method described in the last paragraph forms a transition to the arrangement for diving on an even keel, which is a speciality of the Lake boats. The system applied to these boats consists of several pairs of hydroplanes arranged on the broadside, *i.e.*, of large surfaces, which, arranged obliquely, press the boat under water, without causing the boat to dip if it is properly

handled. The advantage of this method is the fact that the boat is continually on an even keel, when its handling is undoubtedly more convenient and simpler. In this case the crew does not notice the somewhat extensive rocking and the correction of the same, while in a boat that has to be inclined sharply to reach the correct depth, this rocking may cause nervousness and, in some circumstances, panic. The boat fitted with hydroplanes can always keep its adversary in view by means of its periscope, while in a boat of the first type the periscope is inclined each time with the hull of the boat. On the other hand, with a boat which dives on an even keel, there is the disadvantage of loss of power. The large and broad hydroplanes exhaust by friction a not inconsiderable portion of the motive power even when horizontal; when the rudders are set, the sloping planes, which press the boat under water, almost entirely prevent any forward movement.

All these disadvantages are found in the second method mentioned, which is a transitional form of construction, but here they are reduced to a bearable extent. This method is consequently most in vogue in modern submarines.

The time taken to dive from the surface when under way to a depth of about 16 feet amounts at present to $4\frac{1}{2}$—5 minutes. Boats driven by steam engines take a little longer.

VI. Visual Apparatus.

Periscopes are still the only means of seeing from a submarine. A modern visual apparatus has generally the following characteristics.

It consists of at least two tubes, so that while the first is directed upon the enemy or the target, the other part of the horizon may be swept with the second at the same time.

The periscopes revolve on their axes and are movable perpendicularly (like a telescope). Special arrangements are generally fitted for both these movements. The perpendicular movement allows the tube to be lengthened and shortened at will without the boat altering its depth.

Periscopes must allow of as much extension as possible. A view should be obtainable when the boat has dived deep enough to produce no visible wash, and to be beyond the influence of any ordinary motion of the sea. The length is, however, limited by the technical impossibility of constructing periscopes beyond a certain length strong enough to resist the pressure under way without vibrating, which is very prejudicial to observation. The periscope has hitherto not reached a length of more than 23 feet. The views reflected should be well lighted and of natural size to facilitate the judging of distances.

The circle of vision is extended as much as possible, both horizontally and vertically. The former has nowhere reached more than 50°, *i.e.*, about the visual arc of the normal human eye. The latter should be sufficient for the ordinary inclinations of a submarine.

In the course of time a considerable number of different types have been evolved and partly introduced; their details are of no particular interest. All attempt to meet the above-mentioned demands; the principal differences are in the visual arc and in the degree of light. In general, a greater visual arc demands an increase of lenses and prisms, and thereby weakens the light, and *vice versâ*.

There are various forms of eye-pieces; they sometimes have a double and sometimes only a single sight aperture. Some types have fixed eye-pieces, and only the tube with the objective glass turns; the observer has, therefore, the advantage of not having to change his position.

Finally, there is one periscope which gives the possibility of observing both in natural size and with magnification, as in a telescope.

VII. Armament.

Torpedo Armament.

The armament of submarines consists in all nations of bow and stern tubes firmly built in. France alone employs—partly as well as, partly instead of, these—large numbers of releasing tubes of light frame-like construction fitted outside the boat on both sides. The *Circe* class of 351 tons and the *Pluviôse* class (Q. 51—99, with a few exceptions) of 398 tons surface displacement have 7 torpedo tubes; for the 4 larger experimental boats of the latter class, 7 tubes are projected. This arrangement, unfavourable in itself, is supported by the contention that a vessel of the value of a submarine should not have spent its energy with the firing of one or two bow shots; during the course of a submarine attack there is no time to load afresh and to use the same tube several times. England contents herself, as regards C class, with 2 bow tubes; D class is said to have a stern tube besides these. Russian boats have from one to four built-in tubes; Italy fits two bow tubes; America, in most recent times, one (in the *Octopus* there are two bow tubes; the Lake trial boats are to have six tubes).

Every increase of these built-in tubes, especially when it is necessary to reload them from inside in a submerged condition, considerably increases the difficulty of construction, and compels either an increase in the displacement or a limitation of other qualities.

Gun Armament.

Russia has provided for her *Krokodil* class a gun armament consisting of two 4·7-cm. (3-pounder) Q.F. and two machine guns.

VIII. Submarine Tactics; Submarine Defence.

Tactics of Submarines.

Up to the present there can be no question of special submarine tactics in the same sense as for other classes of ships,

i.e., of a combined employment of a number of boats according to determined fundamental principles. An attack by one or several boats on a moving ship only appears possible in specially favourable and exceptional cases. For this purpose sufficient submerged speed as well as a reliable means of signalling is wanting for the boats under water. Submerged speed is here of almost exclusive significance, for a boat that sights a ship must generally itself disappear very quickly in order not to be seen. The submerged speed is, however, still so small compared to the speed of other classes of ships, that it only allows the use of a position of attack accidentally gained, and not the working out of such a position according to plan. The American system of submarine sound signalling, successfully employed in navigation, comes first for communicating under water; other kinds of signals are still in the experimental stage. Advances in both domains will later on certainly permit the employment of submarines on tactical lines; the deficiencies of the individual boat must still chiefly be compensated for by larger numbers. Certain limited data as to the procedure of foreign Powers in the employment of submarine boat flotillas and individual boats have been published by the press. A certain section of the coast to be watched is apportioned to each boat; French experiences—the collision between neighbouring boats, the *Souffleur* and *Bonite*—led to the adoption of neutral stretches between spheres of operation of individual submarines. Such an employment of the boats necessitates their being limited to close coastal defence. England has probably made more extended experiments on the high seas, during constant cruises of several weeks' duration by individual flotillas.

A tactical exercise, which often falls to the lot of submarines in manœuvres, is the transmission of intelligence in an area infested by the enemy or to a blockaded fort.

No standard size for a tactical unit can yet be fixed. According to the distribution in March, 1908, England forms a sea-going division of nine A Class boats, six B Class, or five C Class, with a cruiser as parent ship. France maintains flotillas differing entirely in size and type in her various ports. America has in commission a tender with every three submarines.

Defence against Submarines.

Up to the present there is no practical means of defence against submarines; the only effective protection consists of the imperfect tactical qualities of the submarines themselves. All means employed hitherto, such as spar and towing torpedoes, nets, nets with explosives, special torpedo armament against submarines, employment of smoke bombs to interrupt the field of view, as well as the employment of ships' guns against submarines, appear at the present stage of affairs to be universally recognised as unserviceable. A thorough exami

nation of the course would also appear to give no reliable protection. Dirigible air-ships could, in favourable weather, theoretically give a timely warning of the approach of submarines. Practically, however, their employment is not feasible, by reason of their imperfection in strong winds and when required for long periods. They can also easily become the betrayers of a fleet at great distances, and therefore, in certain circumstances, do more harm than good.

A fleet, which intends to protect itself from attacks, will avoid areas favourable to the work of submarines. Should this not be possible, a very sharp look-out and the utilisation of its superior speed and manœuvring capacity are at present its best available protection.

IX. Accidents. Safety Arrangements.

Serious Accidents during the last two Years.

A.—*France.*

5th January, 1906.—Collision between the *Bonite*, submerged, and the *Suffren*. *Bonite*, fore part crushed, *Suffren* leaking.

28th July, 1906.—On *Cigogne* the sub-structure of the Diesel motors broke to pieces.

18th August, 1906.—Propeller shaft of the same boat broke.

13th August, 1906.—*Esturgeon* sank in dock at Saigon as water was admitted while all hatches were open.

16th October, 1906.—*Lutin* sank off Bizerta in consequence of the bursting of a ballast tank.

11th January, 1907.—*Algérien* sank in Cherbourg harbour in consequence of a cleaning tap of the forward ballast tank being left open.

20th January, 1907—Accumulator explosion on the *Opale*.

12th April, 1907.—The same boat started a leak forward in consequence of great vibration when travelling at full speed.

19th June, 1907.—*Gymnote* sank in dock at Toulon as water was admitted while the ballast tanks were full.

5th July, 1907.—*Bonite* fills in dock during a water-tight test. Probably a valve was left open.

22nd November, 1907.—Collision under water between the *Bonite* and *Souffleur*. *Bonite* badly damaged, *Souffleur* slightly.

B.—*England.*

8th May, 1906.—"A 12": emission of gasoline vapours discovered in time by the aid of white mice.

13th February, 1907.—"A.9." Collision with steamer *Coath*. Conning tower and fore part of boat crushed. Periscope bent.

13th June, 1907.—"C.8": gasoline explosion, commander killed, 2 men injured.

C.—*Russia.*

Explosion of gasoline vapour on the *Sterljad*; 1 man killed, 4 injured.

Besides these a large number of less important accidents, mostly collisions or groundings, have become known.

The most disastrous accidents in France, apart from the loss of the *Lutin*, were the four cases in which boats filled in dock or harbour. This was no fault of the material, but resulted from carelessness or malice on the part of the crew. Insufficient co-operation also between commanders and yard authorities has helped to make these cases possible. The *Esturgeon*, *Algérien* and *Bonite* have been badly damaged, and the *Gymnote* has been rendered unserviceable. Where gasoline engines are employed, the accidents caused thereby have been considerably reduced in number; security against such is, however, not yet attained. In the case of "A.12," the white mice enabled a serious disaster to be avoided. The explosion on "C.8," however, showed that this security is by no means absolute. As long as these dangers with gasoline motors cannot be entirely avoided or, at any rate, as long as no reliable warning apparatus for the detection of gasoline vapours has been invented, the employment of these engines must have an unfavourable influence on the confidence of the crew. It is questionable whether the advantages to be obtained in a military sense are not more than counter-balanced thereby.

Safety and Salvage Apparatus.

Apart from the safety apparatus incorporated in the construction of every submarine—emptying all tanks by compressed air or pumps, safety (drop) keels—the most elementary apparatus in general use is the telephone-buoy releasable from the inside of the boat, which floats up and permits of telephonic communication. The same idea has been applied to providing the boat with fresh air.

Safety apparatus must, however, principally consist in providing suitable material to raise sunken boats. This material must be on the spot during exercises, as experience hitherto has shown that loss of time is fatal to the safety of the crew. Apart from the introduction of suitable apparatus in the boat itself, the countries chiefly interested have therefore proceeded to construct salvage craft for this special purpose. England has fitted out two lighters and has stationed a floating dock of 800 tons capacity for submarines at Portsmouth. Germany has built a special salvage ship, the *Vulkan*, which will be referred to later on; and Italy appears to be projecting a similar vessel.

Various experiments have recently been made with an oxylit helmet. The air in this helmet can be permanently breathed as the oxylit binds the carbonic acid, while the air at the same time is provided with oxygen. By means of this helmet the

crew of the boat is stated to be able to leave the boat through the conning tower or through a torpedo tube.

X. The Position as regards Submarines in the Various Countries.

France.

The Minister of Marine, M. Thomson, has continued the steadfast policy of submarine construction inaugurated on his entry into office. Since 1905 the large 400-ton boats of the *Pluviôse* class have been constructed in very considerable numbers yearly. The Minister of Marine designates them as defensive boats, which can operate in a large area and independently of the coast. Alterations in the construction of these boats are only introduced as far as they are justified by the experience gained in actual trial cruises. Moreover, four experimental boats for purposes of offence were commenced in 1906; three of these are of larger displacement—530 to 580 tons; they are designed for a surface speed of 15 knots, a submerged speed of 10 knots, and a radius of action of 2,000—3,000 nautical miles. The Minister declared that the laying down of further boats of this type was not expedient before positive results with trial boats had been obtained. This systematic procedure has already resulted in a decrease of the time taken for building. The *Pluviôse* was completed in three years, while formerly the times taken were considerably longer.

France still builds all her submarines in the Government dockyards at Cherbourg, Toulon, and Rochefort. Demands have been heard that private enterprise should have its share in this work. The capabilities of naval constructors attached to private firms would thus be utilised, and the building period would presumably be still further reduced. The point as to the possibility of keeping secret new designs in the Government dockyards is considered of less importance.

All submarines ready for service are in commission. The chief stations are Cherbourg and Toulon. Sixteen boats are stationed at the former port, eleven at the latter. Some of these boats have yet to carry out trials. In the course of 1908 these numbers will be increased by two boats at Cherbourg and four at Toulon, for trials only. Smaller stations are: in the Channel, Calais, four boats, formerly at Dunkirk; in the Atlantic, Rochefort, four boats. Outside France there are three boats at Bizerta and four at Saigon. On account of the great heat and the humid atmosphere, the latter have suffered much, both as regards *matériel* and *personnel*, and have only reached a low grade of efficiency. This is again limited by the muddiness of, and the difficulty of navigating, the rivers.

New and more stringent regulations have been issued for the selection and training of submarine crews, on account of the accidents which have occurred.

The flotilla commanders are selected from former commanders of boats. The duration of command is 18 months, preceded by 1 month's trial command. For commanders of boats the duration of command is the same, being preceded by 3 months' training, one of which takes place on the boat to be commanded, under the guidance of the previous commander. Latterly, the second-in-command also remains 18 months on board. Commander and second-in-command may never be relieved at the same time. The crew is specially selected from volunteers; at home they serve 24 months on board, abroad 18 months. Allowances, advantages as regards promotion and leave, and special uniform badges, induce plenty of suitable men to serve. This circumstance, in conjunction with the continuous and instructive exercises and manœuvres, gives the best possible augury for the French submarine *personnel*. Thus, for instance, in September, 1907, the *Opale* completed a cruise of 550 nautical miles with her own resources at a speed of 8 to 9 knots in waters difficult to navigate.

The damaged boats *Lutin* and *Gymnote* have been struck off the list, and are to be employed in exercises in raising submarines. Further, the construction of "Q.61," one of the 21-ton trial boats, and of the two 45-ton boats of the *Guêpe* class, designed during the Pelletan administration, has been stopped.

The laying down of the further eight boats of this class, not yet commenced, was immediately countermanded by the present Minister of Marine on taking office.

England.

On the expiration of the contract with Vickers, concluded on the purchase of the first Holland boats, England will continue to have most of her submarines built by this firm. In addition, Chatham will be made acquainted with submarine construction by the annual assignment of two boats. Classes A, B and C show certain gradual improvements in comparison with the Holland boats, in displacement, seaworthiness, and engine capacity. The advancement from one to another is cautious and by no means exaggerated, nor in any way spasmodic. A more decided advance appears to have been made in the D class, the first of which is still under trial. The new type is said to differ from the C class in having greater displacement, better lines, more powerful engines, and higher speed. Its armament consists of one stern tube, in addition to two bow tubes, like its predecessors. Other details of its construction have not been published. It must be supposed to be a boat of about 600 tons, with extensive superstructure and a surface speed of 16 knots.

The rate of building submarine-boats appears to have been latterly retarded. The Budget of 1908-1909 only provides 10.2 million marks (£500,000) for new construction.

England uses gasoline motors in all her boats—at any rate, up to the C class. The explosions and accidents, formerly numerous, have considerably decreased. This is not entirely due to the use of white mice to give warning of escaping gasoline vapour, but partly also to the greater perfection of the machinery and the fuller experience of the *personnel*.

Of the six submarine-boat stations provided for, only three are occupied up to the present, May, 1908:—

1. Portsmouth.

Belonging to the Home Fleet:—Parent-ship *Mercury*, the captain of which is also Inspecting Commander of Submarines. Torpedo-gunboat *Hazard*, submarines "A.6," "A.11," "A.12," "B.1," "B.4." Parent-ship *Bonaventure*, submarines "C.7—15." Allotted to the Commander-in-Chief, "H.1—5," "A.1—5."

2. The Nore (Sheerness).

Belonging to the Home Fleet:—Parent-ship *Thames*, submarines "C.1—6."

3. Devonport.

Belonging to the Home Fleet:—Parent-ship *Forth*, submarines "B.2," "B.3," "B.5—11." Allotted to the Commander-in-Chief, "A.7—10."

Torpedo-boats, tenders, store-ships, etc., are also allotted to the individual flotillas.

As regards the employment of the *personnel*, it is ordered that no man shall be told off for submarine service for a longer period than five years, including the training period. If, after this period, he has completed a two years' commission on board ship, he can be employed in submarines for a further period of three years.

The training of officers for submarine-boat service comprises a theoretical course ashore of six weeks, practical service on board a submarine as learner for six months, and, after passing an examination, a one-year's commission as second officer in a boat. If efficient, an officer may then take command. Lately, submarine-boat officers, together with gunnery officers, have been most favourably treated as regards promotion.

U.S.A.

Besides the twelve submarines ready, which are all of the Holland type, America has ordered, as a result of the comparative trials of 1907 between a Holland and a Lake boat, seven Holland boats of the *Octopus* type, three of increased dimensions, and two Lake boats. Lake has been entrusted with the construction of two new boats; the boat he used for the comparative trials did not fulfil the conditions of the trial programme, and, in spite of other undoubted advantages, was considered inferior to the Holland type. The Government will take over the two Lake boats if they fulfil certain conditions.

Lake has pledged himself to attain a surface speed of 16 knots instead of the 14 knots demanded. The boats are to be ready on the 1st May, 1910.

The boats ready are not all in commission. Flotillas Nos. 1 and 2 are each assigned three boats and one tender. The rest are either attached to reserve squadrons, or are lying at the yards.

Two boats, *Shark* and *Plunger*, will be shortly transported by steamer to San Francisco (where the *Pike* and *Grampus* already are), and will later on, probably, be moved to Manila in order to strengthen the local defence of the East Asiatic base.

The cruisers *Machias* and *Castine* are stated to have been lately fitted as parent-ships for submarines, with tanks for 10,000 gallons of gasoline, electric engines repairing workshop, air-pumping plant, and a torpedo tube for training with torpedoes.

Russia.

Russia has twenty-nine boats of various types ready, and seven laid down or projected. Of those ready, six are of the Holland type, eight Lake, three are from the Germania Yard, seven are from designs by the Russian Engineer, Bubnow, two are semi-submarines of the Dzwiecki type, three are of special types. Contrary to the American trial results, the Lake boats in Russia have proved superior to the Holland. A voyage undertaken in 1905 by two of the former type without escort in stormy weather, from Kronstadt to Libau—about 430 nautical miles—made these boats specially popular. The three Germania boats recently covered a similar course—Kiel to Libau (425 nautical miles)—at an average speed of 8.3 knots, without interruption. Of those building, two are Lake, one Bubnow, and three Beklemischew boats. The Beklemischew type—a Russian development of the Lake type—appears to have been generally approved for new construction. The *rôle* to be played in the future by submarines in the naval armament of Russia depends upon the final decision of the Government and Duma (not yet arrived at) as to the reconstruction of the fleet.

Russian submarines in commission are distributed as follows for 1908:—

1. Baltic Fleet:—Training-ship and parent-ship *Khabarovsk*; despatch-boats *Voevoda* and *Slavyanka*; five submarines.
2. Black Sea Fleet:—Transport *Penderakliya*, five submarines.
3. Pacific Fleet:—Repair-ship *Kseniya*, fourteen submarines.

Since the spring of 1906 the submarine-division and school for all submarines and attached vessels in the Baltic Sea, has had its station at Libau.

Italy.

Italy has a submarine type of her own designed by Laurenti. The special peculiarities of the latest Italian boats have already been mentioned several times. Besides the old trial boat *Delfino*, there are three boats ready, all with petrol motors for surface running. The two boats of the same class building are to be furnished with a new sort of petroleum motor by Thornycroft. The boats of the new type are to have benzine motors, as already mentioned. When the six boats of this type projected are ready the maximum number of boats approved, namely, twelve, will have been reached. Submarines have already been successfully employed in the manœuvres of 1906 and 1907.

The submarine depôt is to be moved from Venice to Tarento, as the depth is more favourable at the latter place.

Japan.

Japan has seven Holland boats ready; they were built during the war at the Fore River Works, and put together in Yokosuka. They took no part in the war operations. This remark applies also to two small boats of 62 and 86.5 tons, which are said to have proved unserviceable. There are now two boats building at Vickers, similar to the English C class. A transport-ship will, presumably, also be built, capable of containing the two boats, which can be afterwards used for the transport of submarines. The money for two more submarines has been voted.

Austria-Hungary.

Austria-Hungary has evinced more interest in submarine construction since 1906. In that year one million Kronen (£41,667), and in 1907 six million Kronen (£250,000), were voted for this purpose. There are six boats building: two from designs by Lake, at Pola; two of the Holland type by Whitehead, at Fiume; and orders for two have been placed at the Germania Yard at Kiel.

Other Navies.

Sweden has, since 1904, been making trials with the submarine *Hajen*; this boat has taken part in the manœuvres of recent years. The fleet Programme for 1913, at present before a Parliamentary Commission, provides for four submarines of the first class and five of the second class. There is a new submarine building at the Fiat Works in Spezia, which is said to have the same dimensions as the new Italian boats.

Norway's first submarine was ordered from the Germania Yard in 1907. The fleet Programme provides for four boats in all.

Holland is said to have been successful with her Holland type submarine "I" (formerly *Luctor et Emergo*), built at the "Schelde" Yard in Flushing, and experimented with since 1905. Nothing is decided as to further construction.

Denmark has voted a submarine for 1908, and placed the order with the Fiat Works; it is to cost 460,000 Kronen (£25,000)—to be paid for from the sum realised by the sale of old ships—and is intended only for close coastal defence.

Portugal is studying the plans of a submarine prepared by a naval officer. The boat is said to be of 140 tons displacement.

Brazil.—The Fleet Law of 1906 provides for the construction of three submarines. By whom they are to be constructed is not published.

Germany.

After the successful results of the preparatory trials in Germany the construction of submarine-boats has begun on a larger scale. The annual expenditure provided for this purpose has appeared in the Navy Bill.

No details have been published regarding German submarines. It is, however, known that "U 1," after having completed its trials in the North Sea, which had previously been held off Kiel, returned independently round Skagen to Kiel. This voyage of 580 nautical miles was completed without interruption in 62 hours.

In March, 1908, the docking-ship *Vulkan* was completed at the Howaldt Works—a self-propelled salvage vessel, which can accompany submarines and, when necessary, raise sunken boats and at once dock them. Her lifting capacity is 500 tons, sufficient, therefore, to bring to the surface any submarine-boat of a type that can be foreseen at present, even if the boat is full of water.

Apart from ships told off at certain times, the division-boat "D.10" is used in general exercises with submarines.

XI. Conclusion.

At the commencement it was observed that the submarine is to-day no longer under trial, but has become a fully-proved weapon of naval warfare. The question whether submarines are necessary at all is unanimously answered in the affirmative; the number and capacity of the submarines of a nation has to-day become a factor in the valuation of its sea power. The development of the submarine is, however, on the other hand, not yet far enough advanced to enable its employment, in a tactical sense, on the high seas to be thought of. Its present qualities limit it to close coastal defence, and, perhaps, to taking advantage of specially favourable situations at greater distances. Further advances in its utility are only a question of perfecting it technically; these advances are certainly to be expected, as it is at present in an early stage of development. The employment of the submarine for offensive action or in a battle on the high seas is certainly a vision of the future, the discussion of which in the present condition of submarine construction would be of little value.

LIST OF SUBMARINE BOATS EXISTING AND PROJECTED AT THE BEGINNING OF 1908.

Country and Number.		Class and Name.	Displacement. ∧ tons.	Displacement. ∨ cub.m.	Length. m.	Breadth. m.	Motor. ∧	Motor. ∨	Speed. Knots. ∧	Speed. Knots. ∨	Steaming radius. Nautical miles. ∧	Steaming radius. Nautical miles. ∨	Torpedo tubes.	Completed.	
FRANCE.	1	*Gustave Zédé*	206	266	48·5	3·2	Electric		8	5	80	—	1	1893	
	1	*Narval*	106	168	34	3·7	Steam	Electric	10	7	620 / 8	70 / 5	4	1899	
	3	*Morse* class (*Français, Algérien*) ...	136	146	36	2·7	Electric		10	8	100 / 8	—	3	1899	
	4	*Triton* class (*Sirene, Silure, Espadon*)...	155	202	31·5	3·7	Steam	Electric	8	7	500 / 7	25 / 7	4	1901	
	3	*Farfadet* class (*Gnome, Korrigan*)	184	202	41·3	2·9	Electric		9	7	—	—	4	1901-2	
	20	*Naïade* class (*Bonite, Lynx, Anguille, Phoque, Protée, Grondin, Perle, Thon, Souffleur, Ludion, Otarie, Loutre, Méduse, Sturgeon, Oursin, Alose, Dorade, Truite, Castor*)	68	—	23·5	2·2	Electric		8	5	—	40 to 50	2	1902-5	The benzol motor built in afterwards may not be used.
	1	*Z*	202	220	41·3	3·0	Petrol	Electric	8·3	4·1	—	—	4	1905	
	2	*Aigrette* class (*Cigogne*) ...	172	220	35·8	3·9	Diesel	,,	8·7	6·4	1,200	—	4	1905	
													6*	—	* *Cigogne.*
	1	*X*	168	—	37·4	3·1	Benzol	Electric	10·5	7	—	—	4	1905	
	1	*Y*	213	—	43·5	3·0	Petrol motor for ∧ & ∨ cruising		10	6	—	—	5		In the trial stage the engines may have been altered.
	1	Ω	301	400	47·0	4·2			11	8	—	—	6		
	6	*Emeraude* class (*Opale, Rubis, Topaze, Saphir, Turquoise*)	390	450	44·6	3·9	Diesel	Electric	11·3	(9)	1,000 / 8	—	6	4 1896-08	2 building.
	2	*Circe* class (*Calypso*) ...	351	498	47.1	4·9	—		11·8	7	2,000 / 8	—	6	1907-8	

∧ = on surface ; ∨ = submerged.

FRANCE. (contd.)	18	*Pluviôse* class (*Ventôse, Germinal, Floréal, Prairial, Messidor, Thermidor, Fructidor, Vendémiaire, Brumaire, Primaire, Novôse, Papin, Fresnel, Berthelot, Monge, Ampère, Gay-Lussac*)	398	550	51·1	4·9	Electric	12.0	7·8	1,000 / 8	—	7or5	1907-8	The three last boats have petrol motors.
	16	*Q* 70-72, 75-81, 83-88 ...	—	As *Pluviôse*		—	Petrol motors	As *Pluviôse*						13 commenced in 1906
	1	*Q* 73	577	810	64·5	6·8	Diesel or Steam	Electric	15	10	2,00 0 to 3,000		7 6 7 7	B'ld'g
	1	*Q* 74	530	628	64·8	4·3		,,	15	10				
	1	*Q* 82	555	735	56 2	8·0		,,	15	10				
	1	*Q* 89	355	450	44·0	4.0	Steam		15·8	10				
	10	*Q* 90-99	As *Pluviôse*											
	5	*Q* 100-104	Sanctioned in 1908 Budget. (Probably as *Pluviôse*).						—	—	—	—	—	Building.
ENGLAND.														
	5	*H* 1-*H* 5	104	124	19·2	3·6	Gasoline.	Electric	8	6·5	350 / 8		1	1902
	4	*A* 1-*A* 4	180	207	30·2	3·9	,,	,,	11·5	7·5	300	30	*A*1 1 others 2	1903
	8	*A* 5-*A* 12	180	207	,,	,,	,,	,,	11·5	8	500	,,	2	1904-5
	11	*B* 1-*B* 11	280	318	41·1	4·1	,,	,,	12·5	8·5	500	—	2	1905-6
	11	*C* 1-*C* 11	—	318	,,	,,	,,	,,	12·5	8·5	1,350 / 9	—	2	1906-8 2 Propellers.
	1	*A* 13	—	207	30·2	3·0	,,	,,	11·5	8	—	—	2	1908
	19	*C* 12-*C* 30	—	318	41·1	4·1	,,	,,	14	8·5	1,350 / 9	—	2	1908-9
	1	*D* 1	—	600	—	—	—	,,	(16)	(10)	—	—	3	1908
		D Class (Sanctioned for 1908, £500,000)	—	about ,,	—	—	—	,,	,,	,,	—	—	3	1909-10

Country and Number.	Class and Name.	Displacement.		Length.	Breadth.	Motor.		Speed. Knots.		Steaming radius. Nautical miles.		Torpedo tubes.	Completed.	
		∧ t.	∨ cub.m.	m.	m.	∧	∨	∧	∨	∧	∨			
RUSSIA.														
7	*Delfin* class (*Kassatka, Skat, Nalim, Makrel, G. Scheremetjew, Okun*)	115 to 150	150 to 200	24	4·3	Various combustn engines	Electric	6·5 to 8	about 6	—	—	4	1903-4	Bubnow System.
6	*Som* class (*Byeluga, Lossos, Peskar, Schtschuka, Sterlyad*)	120	—	19·3	3·6	Gasoline.	Electric	9·5	7·4	—	—	2	1904-5	Holland boats.
1	*Forel*	17	—	—	—	Electric		8	6	—	—	1	1904	Germania trial boat.
6	*Assyotv* class (*Bytschok, Kefal, Paltus, Plotwa, Ssig*)	135	175	20·5	4·2	Gasoline.	Electric	10	7	2,500	30	3	1905	Lake boats.
1	*Keta*	—	—	—	—	—		—	—	—	—	—	—	Trial boat.
3	*Karp* class (*Karas, Kambala*)	200	240	39·9	3·1	Petrol	,,	10·5	8	1,800 / 8·5	40 / 7	1	1906	Germania boats.
	Besides 2 semi-submarine boats—*Dzwiecki* type.													
4	*Crocodile* class (*Kaiman, Drakon, Alligator*)	—	400	38	4·3	Gasoline	,,	(15)	(6·5)	—	—	4	B'ld'g 1908	Lake boats.
1	*Akula*	360	—	—	—	—		—	—	—	—	—	B'ld-ing	Bubnow boats.
1	*Minoga*	117	—	—	—	—		—	—	—	—	—		
1	*Ssudak*	110	—	—	—	—		—	—	—	—	—	—	Bought from Newski Yard, 1908.
	Besides 3 boats projected—*Beklemischew* type—each of 450 tons.													
U.S.A.														
1	*Holland*	64	74	16·4	3·1	Gasoline	Electric	6	4	200	30	1	1900	
7	*Plunger* class (*Pike, Adder, Grampus, Moccasin, Porpoise, Shark*)	105	120	19·3	3·6	,,	,,	8·5	7·2	300	—	1	1903-4	*Holland* type.
3	*Cuttlefish* class (*Tarantula, Viper*)	—	173	24·7	3·9	,,	,,	10	8·5	—	—	2	1906	
1	*Octopus*	—	278	32·3	—	,,	,,	11·6	10	1,000	—	2	1906	
	Building: 4 *Octopus* type, 3 larger boats of same type, and													
2	Experimental Boats, *Lake* type	—	500 (about)	49	—	Gasoline	Electric	14	9·5	3,000	(70)	6	May, 1910	Will not be purchased until trials satisfactory.
8	Submarines sanctioned by Budget of 1908	—		—	—	—	—	—	—	—	—	—	—	

ITALY.															
1	*Delfino*	95	107	24	2·9	Benzine	Electric	7	6	—	30	1	1896	Trial boat.
5	*Glauco* class (*Squalo, Narvalo, Otaria, Tricheco*) ...	150	175	36	4·3	Petrol	,,	13·5	7	2,000/8	—	2	1905-8	Last 2 still building.
7	New Series	180	230	42·5	5·1	Benzine	,,	15	8	875/8	40/5	2	—	Projected.
JAPAN.														
5	Nos. 1-5	106	125	19·8	3·7	Gasoline	Electric	9	7	300/9	28/7	1	1905	
2	,, 6-7	62 or 86·5	—	—	—	—	—	9	7	—	—	1	1905	
2	,, 8-9 as English C. class													
2	,, 10-11 sanctioned ...													
AUSTRIA-HUNGARY.														
2	*Lake* type	250	—	50	3	Diesel	Electric	12	7	—	25/7	—	1908	Building at Pola.
5	*Holland* type b'ld'g at Fiume	270	—	—	—	—	—	13	8	—	—	—	—	
2	*Germania* type building at Germania Works	390	—	—	—	Petrol	Electric	12	7	—	—	—	—	
SWEDEN.														
1	*Hajen*	107	127	19·8	3·6	Petrol	Electric	12	7	1,000	—	1	—	
1	*Fiat* type	180	230	42·5	4·3	Benzine	,,	15	8	1,000/8	40/5	2	Aut. 1908	Building at Spezia.
NORWAY.														
1	*Germania* type building at Germania Works, Kiel ...	—	—	—	—	—	—	—	—	—	—	—	—	
HOLLAND.														
1	No. 1	—	120	20·4	3·5	Gasoline	Electric	8·9	7·2	400/8	30/7	1	1905	

THE CAVALRY OF FREDERICK THE GREAT: ITS TRAINING, LEADING AND EMPLOYMENT IN WAR.

By Major W. H. GREENLY, D.S.O., p.s.c., 12th Lancers, Brigade Major, 1st Cavalry Brigade.

Wednesday, 31st March, 1909.

General Sir J. D. P. FRENCH, G.C.V.O., K.C.B., K.C.M.G., Inspector-General of the Forces, in the Chair.

THE ARMY BEFORE THE ACCESSION OF FREDERICK THE GREAT.

IN order to form a clear idea of the work accomplished by Frederick the Great in raising the Prussian Cavalry to that pitch of perfection to which it attained under his instructions, it is necessary to consider the condition of the Army as he found it in 1740 on his accession to the throne of Prussia.

The creator of that Army, with which Frederick was afterwards able to more than hold his own against the whole of Europe, was his father, Frederick William the First, generally known as the Drill-Sergeant of Europe.

In all matters connected with the Army his right-hand man was Prince Leopold of Dessau, well known to readers of Carlyle as The Old Dessauer. He, like his chief, was a veteran of the wars of Marlborough and Prince Eugene, and in these had greatly distinguished himself.

That these men understood their business, in so far at least as the training of the infantry was concerned, was amply demonstrated soon afterwards by the Prussian victories in the first Silesian war.

Traces of two of their most important reforms are visible in the German Army of to-day.

In the first place, the corps of officers was put on a sound footing and established in that high position in the State which they still most worthily occupy. Secondly, the introduction of the Canton system in 1733 laid the first foundation of the principle of universal service on a territorial basis.

"All dwellers in the land"—so ran the edict—"are born to arms, and every man belongs to that regiment in whose district his home lies."

Exemptions, however, were numerous; the numbers required for the Army were small in proportion to the population; the period of service was unlimited, and of those actually serving one-third were allowed to be foreigners, and were recruited abroad.

Both enlisting and maintaining the soldiers was the private concern of the company and squadron commanders.

Except for reviews the squadron commander was only supposed to keep with the colours three-quarters of the establishment, and in actual practice he also allowed a third of the remainder to be on special furlough.

Only those present with the colours received any pay, and the balance thus saved was supposed to be used for recruiting purposes. Accordingly, when he could obtain recruits cheap, the squadron commander made a profitable business out of the squadron, and the command was naturally a much-desired post

Horse-breeding in Prussia at this time was at a low ebb, and the bulk of the horses for the Army were brought from abroad.

As regards the organisation and methods of fighting of the Army as a whole, time does not admit of more than a brief reference.

The proportion of cavalry to infantry was, roughly, one to three, and of artillery one light gun, usually a 3-pounder, to 1,000 of the other arms; in addition there were a few heavier guns and howitzers.

A battle generally began by the artillery advancing and engaging in a duel, while the infantry, with the cavalry guarding their flanks, halted out of range awaiting the result. When the infantry lines had arrived within 500 or 600 yards of each other, the opposing horsemen advanced to the cavalry fight. During this they often drifted away from the battle-field, and not infrequently remained absent for the rest of the day.

After a battle the victorious army usually re-formed on the ground it had won, and rarely pursued. The cavalry never followed up the beaten enemy, and touch was quickly lost.

To turn now in more detail to the cavalry. It was organised into Cuirassiers, Dragoons and Hussars. The Cuirassiers rode large, heavy horses, nearly all blacks, while the Hussars were mounted on animals which averaged rather under 15 hands. All were armed with a sword, two pistols, and a carbine, Dragoons having in addition a bayonet. They rode in panelled saddles of the German pattern, and bit and bridoon bridles, the bit being first introduced shortly before Frederick the Great's accession. The dress of the period is too well known to need description. The only armour still retained was the breast-piece of Cuirassiers.

Regiments of Cuirassiers and Dragoons had five or ten squadrons, Hussars three or six. The squadron was the real unit for all purposes; it consisted of six officers, twelve non-commissioned officers, and about one hundred and thirty

troopers. It was divided into four troops, and formed up in three ranks, the largest men and horses in the front rank. Line was the formation for attack, which was carried out at the trot.

Speaking generally, the drill of the cavalry corresponded closely with that of the infantry; much of it was extremely complicated, and without the slightest value in the field. All cavalrymen, especially the Dragoons, were trained to fight on foot; but the methods employed were practically the same as those of the infantry. Mounted drill was only carried out once or twice a week, and drill on foot once a week.

The cavalry regulations, in spite of their defects, contained a good deal of sound instruction for the training and employment of cavalry. The practice, however, fell far short of the theory, and during 13 years of peace matters in this respect had been growing steadily worse. The endeavour to economise by saving horseflesh had had the inevitable result that the men had been more and more exercised on foot, less and less on horse-back. The constantly recurring fallacy that the rifle is the cavalryman's chief weapon was also widely accepted. The fact is, that, good soldiers as they were in many respects, neither Frederick William nor Prince Leopold, both infantrymen, had any conception of the true functions of cavalry or of the principles which should govern its training.

Significant of the whole state of affairs is the order prescribing the trot as the pace of the charge. Even under Frederick William's father, the attack had been practised at the gallop, while in England, nearly 100 years before, Cavaliers and Roundheads had ridden at each other at the full speed of their horses. But with all these faults the cavalry, though wretched horsemen, were, in common with the rest of the Army, imbued with the most perfect discipline—a fact which goes far to explain the wonderful rapidity with which they improved when once they came under the direction of a true cavalry soldier.

From the Accession of Frederick the Great to the End of the Second Silesian War.

Frederick the Great came to the throne in May, 1740.

The cavalry at that time consisted of:—

12 regiments of Cuirassiers, 60 squadrons.
6 regiments of Dragoons, 45 squadrons.
2 corps of Hussars, 9 squadrons.
i.e., in all 20 regiments in 114 squadrons.

The King thus described the Cuirassiers: "They consisted, like the infantry, of very big men, and rode enormous horses. They were giants on elephants and could neither manœuvre nor fight. There was never a parade at which some of them did not fall off. They were not masters of their horses, and were far more drilled on foot than on horseback. The officers

had no idea of mounted duties at all, least of all of their duties in war, and had no knowledge of the use of ground. As regards what is required of cavalry in battle, they were absolutely without instruction."

Then again: "My father left me a bad cavalry: hardly an officer who knew his duty. The men were afraid of their horses, and hardly ever mounted them; they only knew how to drill on foot."

Six months after his accession war broke out, and the poor opinion he had formed of the cavalry received only too clear a confirmation.

The Austrian Hussars at once showed themselves superior to the slow and clumsy Prussian cavalry. In the first two months they had surprised a regiment of Dragoons, captured their standard, and nearly made a prisoner of the King himself. They had also slipped through the Prussian outposts into Silesia, and were already carrying on there a harassing guerilla warfare.

The first serious action of the war was the battle of Mollwitz, fought on the 10th of April, 1741. Here the Prussian cavalry certainly proved themselves brave enough, but in other respects they hopelessly failed. They were too slow to take advantage of an excellent opportunity of charging the Austrian cavalry in flank, and as they were beginning to be got on the move to do so they were themselves charged by other Austrian cavalry and completely routed. The King put himself at the head of some squadrons in reserve and endeavoured to save the situation, but the whole Prussian cavalry was quickly swept from the field.

The King himself found safety among the infantry, whose steadiness gave him the victory.

Nothing can show more clearly the results of the training of Frederick's predecessor. On the one hand, the infantry "a splendid instrument of war"; on the other hand, the cavalry "neglected and completely ignorant of its duty."

Frederick's comments were: "The cavalry are so bad that it isn't worth the devil's while to take them away. They can drill with the precision of Grenadiers, but are equally slow; in front of the enemy they are useless, and invariably arrive too late."

Improvement, however, was already beginning, and by the end of July we find the King in his camp at Strehlen showing off 62 squadrons to the French Ambassador. The latter, who had seen their wretched condition at the time of Mollwitz, now reports to the French King: "This cavalry is the most surprising thing in its kind that can be imagined"; and this only three months after the battle.

In the following March, 1742, the King issued some important instructions. "Instructions for the Cavalry in Battle" and "Instructions for the Colonels and other Officers of Hussar Regiments." These instructions breathe the true cavalry spirit

in every line, and are full of sound cavalry teaching. Among the points emphasised are the importance of the squadron as the tactical unit, and the necessity of the squadron leader being ever ready to act on his own initiative. The Prussian cavalry was always to be the first to charge, and never wait to be attacked. The gallop was laid down as the pace of the charge. "When the cavalry advance they are to do so at the trot until within about 100 paces of the enemy, then, still well closed, the horses are to be driven in at the gallop, and the enemy ridden down." Squadron commanders are made responsible that not a man uses carbine or pistol in the mounted attack; the enemy is to be ridden at sword in hand.

The instructions for the Hussars, too, are most comprehensive. The officers are told that their first care must be to have their troops as well drilled as the Dragoons, and that their usual form of attack is to be at close files with sword in hand. In attacking Hussars, not more than one troop in each squadron is to skirmish in loose order, firing from their horses; the remainder are to keep closed, and seek for opportunities to attack with the sword.

The principles laid down for outposts, patrolling, and attacks on convoys are much the same as those of to-day. Officers are cautioned that when sent out reconnoitring, "it is a poor kind of bravery on this service to get engaged with the enemy; they should rather act by cunning and stealth."

Meanwhile the war continued. The next considerable battle, that of Chotusitz, May, 1742, showed that the sound teaching and indefatigible energy of the King was already bearing fruit.

The cavalry, though finally defeated, achieved some success, and on the whole the day was by no means discreditable to them. That they took their fair share in the fighting is proved by their losses—1,280 men and 2,500 horses out of a total of less than 10,000 cavalry.

The King attributed their defeat chiefly to two causes: too great intervals between the squadrons and the want of a third line. These defects he immediately set about remedying.

Less than a month after Chotusitz the Treaty of Breslau brought the King the peace he so much needed for continuing his reforms.

He now made time, among the countless other duties which claimed his attention, to devote much of his energy to personally instructing his cavalry. He showed in this work an expert knowledge of his subject and a true appreciation of those qualities, moral even more than physical, which alone can convert a collection of men and horses into cavalry.

From this time forward progress was rapid and continuous. In the second Silesian war, but two years after its disaster at Mollwitz, the cavalry had reached a high state of efficiency. Hohenfriedberg, Soor, Hennersdorf, and Kesseldorf are all names glorious in the annals of Prussian cavalry.

In this war it was the Austrian horsemen who felt and showed their inferiority to the Prussians; their excuse at Hohenfriedberg proved unmistakably which way the balance was inclined: "We could not charge the Prussians' right wing," they said, "partly because of the morasses that lay between us, and partly because they rushed across and charged us."

We are reminded of Cromwell's cavalry charging across the ditch at Marston Moor, and can recognise the same initiative and dash, the same confidence of the leaders in the riding of the men.

Then followed ten years more of peace—1745-1756—and at the end of those ten years, that is, in the early part of the Seven Years' War, the Prussian cavalry first reached its zenith.

Frederick's Principles of Training.

We must now turn again to the King, and examine the methods by which he transformed the cavalry of Mollwitz into that of Rossbach, Leuthen, and Zorndorf.

During these years of peace Frederick had worked unceasingly at his own military development. The opinions he had formed in his war experience he now put practically to the test, and communicated to the Army in the form of instructions. His first care was the training of the leaders; he knew that the education of these to the same principles of thought and action was the only means by which to guarantee the co-operation of all parts of his Army when in the presence of the enemy.

"The campaigns which I have fought," he wrote, "have given me the opportunity to reflect upon those principles of the great art by which different Empires and States have triumphed or been overthrown. I have thought it right to communicate these ideas to those who stand next me in command, so that on half a word from me they shall understand my intentions, and when I am not present be able to act upon my principles."

The King strove continually to direct the military education of his officers towards what was useful for *war*. Under Frederick William they had learnt to drill; Frederick the Great taught them tactics.

He regarded manœuvres as the chief means of educating the leaders, especially in teaching them the use of ground, and he insisted far more upon their recognising the object of every movement than upon the repeated practice of the mere forms.

Prussia was still a small State, and surrounded on all sides by greedy enemies; her only chance, both in strategy and tactics, was to compensate for want of numbers by skill, mobility, and a vigorous offensive. Towards this offensive, therefore, Frederick's training was continually directed. In speaking of generalship, he writes: "It must become the common custom for Prussian generals to act in a way which in any other country would be considered rash; they must

always be ready to undertake everything which it is possible for flesh and blood to carry out."

The spirit of boldness and energy which he infused into the Army as a whole was, from the very nature of cavalry, of particular importance to that branch of his Service. To return to detail.

In the first place, the greatest possible care was devoted to the individual training of man and horse. Just as the efficiency of all larger units depends upon the thoroughness of the training of the squadron, so the squadron can only be brought to perfection by the most careful individual instruction of each man and horse in the ranks. "The cavalry must be instructed man by man and horse by horse," was Frederick's order. "The officer must see that the men ride continually, so that each man can turn and twist his horse and be completely its master." He also said that "the day was wasted on which the rider had not exercised his horse."

Time does not admit of going into the details of the individual training, but those who care to do so will have their trouble well repaid. The point that stands out most clearly is that Frederick never mistook the means for the end; he aimed at producing a good "campaign horse"—one that would go collected and in the rider's hand over the roughest ground and could be trusted to jump with safety all ordinary obstacles to be met with in the field. In the same way every rider was to have his horse completely under control and to have such complete confidence in his mount that he could devote his whole attention to keeping his direction and his proper position in the ranks.

As regards mounted movements in formed bodies, a totally new atmosphere was introduced; the key-note was mobility and the aim in future was to be the highest speed combined with precision and absolute cohesion.

The manœuvring power of Frederick's cavalry, certainly in large masses, has never been surpassed, and yet modern conditions make this power of rapid manœuvre of even greater importance than it was in his day. A large body of cavalry can only manœvre as well as its worst squadron, and though there are many squadrons in our cavalry which are admirably trained, yet it is open to doubt whether we have as yet attained to that uniformity of excellence which can alone permit of the precise and rapid manœuvre of really large bodies.

Constant exercise in the "rally" was another point on which great stress was laid. It was carried out daily, not only after an attack, and was practised over all sorts of ground. "The men are not to look for their original places in the ranks, not even for their proper troops, in order that the squadron may be rallied the quicker. The order does not matter only that the men are there."

"I do not want a mêlée," he says, "the cavalry must charge knee to knee."

He aimed at decisive results, and these are only to be obtained by the knee-to-knee charge, with the fixed determination to ride the enemy down or to force him to seek safety in flight.

The King at this time personally supervised the training and was his own inspector of cavalry.

From time to time he summoned the higher leaders from the farthest parts of Prussia to Potsdam or Pomerania that they might see his methods with their own eyes. On these occasions he would sometimes take command of a squadron himself in order to make perfectly certain that they understood what he wanted. He thus secured that uniformity of system and training which alone made it possible to manœuvre 40 or 50 squadrons hastily collected from widely separated garrisons.

At his inspections he was most particular that the cavalry should move over every sort of country; he would often take up a position wherever he happend to be and make large bodies of cavalry charge towards him, criticising severely if the ranks became disordered by the rough ground.

He set up as his ideal that "the Cuirassiers and Dragoons should be as adroit as the Hussars," that "the Hussars should be able to charge with as much cohesion as the heavy cavalry." This ideal he fully attained, and without damaging the special qualifications of each branch.

As efficiency increased so the King's demands on the cavalry became greater. In 1750 he lays down that in approaching an enemy 1,200 yards away, the first 600 are to be covered at the trot, the last 600 at a good gallop. Four years later he demands 4,000 yards at the trot, 1,800 at the gallop, and the last 300 to 400 at full speed.

While constantly reminding leaders of the importance of individual training as the necessary foundation of the whole, the King was careful to afford them opportunities of handling large masses, and in his camps of exercise he often assembled as many as 60 to 70 squadrons.

Such, then, were the methods of training of this great cavalry soldier; but in addition to his untiring zeal for efficiency he possessed a delightful human personality which called forth the complete devotion of all with whom he came in contact.

One story may here be told to show the love and confidence with which the Army regarded him, and the personal relationship which existed between them.

Late in the evening on the eve of the battle of Leuthen, the King rode into the bivouac of the Life Guard Cuirassiers. The men were standing round the fires and bade him a cheery "Good evening" as he rode up. Some old veteran asks: "What is thy news, then, so late?"

"Good news, my lads; to-morrow you will beat the Austrians roundly." "That we will, by God," they answered. "But just think of their position and how they have entrenched,"

said Frederick. "And if they had the devil in front and all round them we will knock them out, only thou lead us on."

"Well, I will see what I can do; now lay you down, and sound sleep to you." "Good-night, Fritz," answer all, and the King rides on in the dark to the next regiment.

THE CAVALRY IN WAR.

Having considered the principles on which it was trained in peace, it is now time to examine the cavalry at work in war.

Armies at this time moved very slowly, and remained closely concentrated both at the halt and on the march; for this reason no great necessity was felt for strategical reconnaissance as now understood.

The imperative need for this arose later on. From the time of Napoleon onwards all campaigns have shown the vital importance of such reconnaissance in order to ensure "strategical liberty" for the commander of an army. This liberty can only be secured by the right use of cavalry—the strategical instrument of the Commander-in-Chief.

Modern conditions make strategical liberty more important than ever; the enormous masses of troops employed and the wide fronts on which armies operate make it increasingly difficult to alter dispositions once made, or to assign to an operation a new objective. In other words, the strategic direction of armies has grown in importance, and, as an inevitable consequence, the value of good cavalry has increased accordingly.

Yet there is no reason why Frederick the Great should not have made more use of his cavalry as a strategical instrument. Cromwell had set the example nearly 100 years before, and the method in which he employed his cavalry before the battle of Preston must have been known to Frederick, who was a great student of history.

The instance is worth recording:—In 1648 a Scottish army under Hamilton crossed the English border and advanced southward along the western coast. Cromwell, who was with the English army about York, nearly 100 miles away, at once pushed forward to the Pennines a force of cavalry under Leslie. This cavalry not only kept Cromwell constantly informed of the position of the Scotch but also effectually prevented the latter from gaining any information. The result was the complete surprise and almost total annihilation of the Scottish army at Preston.

Frederick certainly laid the greatest stress on reconnaissance, but it does not appear to have been carried out to any great distance. For instance, in the advance on Lobositz the Duke of Brunswick-Bevern, when at Fishbach, had Hussar patrols on the Elbe about 10 miles to the front. On a certain occasion in the Rossbach campaign Marshal Keith sent out 15 squadrons on reconnaissance; they made a fairly wide move-

ment and covered about 30 miles in all without meeting the enemy, but they did not touch any point more than 10 miles from where they started.

In the same campaign the King himself cannot have had patrols very far to the front, as he received the first news of the position of the allied army when he was only four miles away from them.

On the other hand, the tactical reconnaissance, when the enemy had once been located, was very thorough. This reconnaissance was usually entrusted to Hussars; but "Hussar service" was taught as part of the duty of all cavalry. The commander of the force often accompanied the reconnoitring squadrons.

On the day of the battle of Lobositz, at half-past five in the morning, the King rode out to the outposts to reconnoitre. There was a thick mist, and the Austrian cavalry was found covering the front of their army. To clear up the situation the King ordered forward a force of 16 squadrons. This reconnaissance led to a cavalry fight and the opening of the battle.

On the day before the battle of Gross Jaegersdorf the hostile camps lay about five miles apart. Early that morning 40 Prussian squadrons were sent forward to reconnoitre, the Commander-in-Chief, Field-Marshal von Lehwald, accompanying the reconnaissance. The Russian position was covered in front and flank by light cavalry, and the Prussian attack on these caused the Russians to occupy their battle positions. The reconnaissance successfully located the flanks of the position, and the squadrons then returned to camp.

Again, before Leuthen 50 squadrons were sent on in front of the advanced guard to reconnoitre the Austrian position; they were met by 5 Austrian regiments, and a cavalry fight ensued. The Austrian cavalry, heavily outnumbered, were driven from the field. The King, who had followed the victorious Hussars, was then able, with a small escort, to personally reconnoitre the position from the Schönberg.

These examples are sufficient to show that the same principles operated in the days of Frederick the Great which still hold good to-day. Information of any value had to be fought for then as it has to be fought for now; great cavalry fights took place in the endeavour to gain information, and heavy prices had to be paid before it was obtained.

Our "Cavalry Training" clearly lays down that the ultimate objective of our independent cavalry is to discover the enemy's *main columns*. The first obstacle will usually be the enemy's independent cavalry, but when that has been defeated there will still remain a second obstacle—the protective cavalry, which will have to be pierced or thrown aside before the information can be obtained.

These cavalry fights were not, in the days of Frederick any more than at present, the object in themselves; they were and are the means, and the *only* means, by which the end of obtaining information can be gained.

Great importance, too, was attached to reconnaissance of ground. Officers were often sent ahead to reconnoitre routes to be used, and all cavalry when manœuvring sent forward scouts, frequently officers, to examine the ground in front and report upon its practicability. We see frequent evidence of this careful reconnoitring. At Zorndorf Seidlitz found the boggy valley of the Zaber between him and the Russian right flank, against which he was operating. He sent officers and pioneers to reconnoitre it and to improve passages across it, marking the crossings with whisps of straw. This reconnaissance made possible his subsequent crossing to charge the Russian flank.

When waiting in positions of readiness, too, the cavalry were always careful to reconnoitre the ground in the vicinity so as to be able to deploy rapidly and operate at once in any direction required. Had their example in this respect been followed by the French in 1870, many disasters would have been avoided and some great successes might have been gained.

As regards the employment of cavalry on the battle-field itself, the King's usual plan was to draw them up in three lines on one or both flanks of the infantry.

The accompanying plan shows an "order of battle" issued by Frederick in 1748.

The first line was generally the strongest, and in it the intervals were small. The second line was about 300 yards behind the first, squadrons at wide intervals, and some of them often outflanking the first by about 150 yards. The third line, or reserve, stood about 200 yards in the rear of the second, the squadrons at wide intervals.

The principle of their employment was as follows:—

The first two lines were the attacking lines; the first was meant to ride down the enemy, and was therefore the strongest, and formed of Cuirassiers; that is, the heaviest men and horses. The second line was in close support of the first, its primary duty being to fill up the gaps and to attack any bodies of the enemy who might break through. It did not, however, merely follow the first line, but often manœuvred round its flanks and brought off a flank attack on the enemy's supporting lines, as, for example, at Rossbach. Dragoons were usually employed in this line, as they were held to be rather more mobile and capable of quicker manœuvre than the Cuirassiers.

The third line was often used as a general reserve for the whole army; it was nearly always formed of Hussars, the most mobile of the three sorts of cavalry. It was employed where most needed at any particular time to re-establish the fight or to protect the rear and flanks of the lines in front.

It was forbidden by regulations to completely use up all three lines until the battle was decided, and at least four squadrons were to be kept back in reserve. "Only when the enemy's infantry have been finally driven from the battle-

field are these four squadrons to be thrown into the pursuit of it."

The above was the usual distribution and employment, but the King did not tie down the cavalry leaders to any particular form, and was quite content to leave them a free hand to adopt whatever formation they found most suitable.

No tactical unit higher than the regiment existed, and the grouping of squadrons was settled on each occasion by the order of battle.

As regards intervals between squadrons in line, the practice seems to have varied at different times. In one place we read of 12 paces between squadrons, in another of lines of many squadrons charging with no intervals at all.

In studying past campaigns, nothing stands out more clearly than the all-important influence exercised on cavalry by the quality and character of the leadership. With cavalry everything depends upon the initiative of the leader, his personality is the decisive factor; the battle of Kolin is an excellent example. On the one hand, the want of grasp of the situation, the lack of energy and dash of the 68-year-old Penavaire resulted in total failure. On the other hand, the brilliant leading and personal magnetism of Seidlitz, then 36, inspired his squadrons with the most devoted bravery in their attempt to avert disaster.

The Prussian cavalry at Kolin lost about 25 per cent. in men and 30 per cent. in horses. At this time, however, the cavalry considered themselves a means of deciding battles equally important as the infantry, and they were equally prepared to suffer losses.

The unfortunate expression of "death ride" for every cavalry attack entailing casualties, had not then been invented, and the higher leaders were not prevented from using their cavalry in battle by the thought that it was so valuable that it must avoid all losses. On the contrary, Frederick was of the same opinion as that later expressed by General von Schmidt: "This arm is far *too* costly to have any check placed upon its employment." He believed in his cavalry, and was careful to teach them to believe in themselves. He educated them up to a readiness to act and to a determination to conquer absolutely regardless of consequences.

This sound principle is apt to be forgotten, and not only the Prussian Army but our own as well has suffered from its neglect.

Writing of the Prussian cavalry in the war of 1866, Moltke says: "Our cavalry failed, perhaps, not so much in actual capacity as in self-confidence. But all its initiative had been destroyed at manœuvres, where criticism and blame had become almost synonymous, and it therefore learnt to shirk bold independent action."

Self-confidence, moral, is the very life-blood of cavalry, and moral is a delicate plant which must be carefully fostered.

Every officer would do well to ponder upon these words of Moltke's, and when acting as umpire to pause before giving his decision that "the charge was hopeless and the whole of the cavalry must be put out of action."

The principal features of Frederick's mounted attacks were these:—

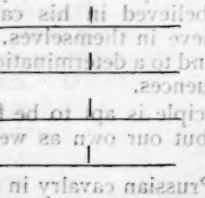
1. The simultaneous action of the whole force available, with one common object; no niggardly pecking with isolated detachments in succession, but a bold launching of a great mass against one objective.
2. The combination of front and flank attack; the chief blow in flank if possible.
3. Surprise.

As the best means of effecting surprise it was the constant endeavour to carry out the deployment for attack under cover, and when this was possible the attack was nearly always successful. Examples of this are seen in Ziethen's attack at Prague, Driesen's at Leuthen, and Seidlitz's two attacks at Rossbach.

The effect of cavalry has always been more moral than bloody; their successes counted by the tactical results produced, not by the actual losses inflicted. In producing this moral effect, surprise is one of the most potent factors, and all modern campaigns furnish incidents which show that "surprise is still the deadliest of foes."

The above principles are eternal; it is their application only which varies. Let us now see how the Prussian leaders applied them.

At the battle of Prague the Austrians had a mass of over 100 squadrons on their right wing. They were drawn up in four lines, one behind the other, and with a few squadrons of Hussars in échelon to the right front:—



The Prussians attacked this mass in front with 20 squadrons in one line. The Austrian first line awaited the attack at the halt, received it when quite near with fire from horseback, and then advanced a very short distance to meet it. The result was the overthrow of the Austrian first line; but the Prussians came to a standstill against the second line, were charged in flank by the Hussars, and had to withdraw.

The attack was soon renewed, this time with 20 squadrons in the first line, 20 squadrons supporting in second line, and a simultaneous flank attack on the Austrian right by two regiments of Hussars. A desperate hand-to-hand fight amidst dense clouds of dust ensued, and finally the Prussians, greatly outnumbered, again withdrew.

The Austrians then sounded the "rally," and began to re-order their lines, without however, taking any measure whatever for security against surprise.

Meanwhile Ziethen had arrived with 45 fresh squadrons, and deployed them *under cover* opposite the right flank of the Austrians, who at the moment of attack were still in four lines. Ziethen's formation was two lines—27 squadrons in the first line and 18 in the second.

The Austrians were completely surprised. A shout arose in the ranks that they were surrounded, and nearly the whole mass, seized with panic, broke and fled.

The Prussians then committed the mistake against which the King had so constantly warned them, and instead of rallying rushed wildly in pursuit.

A proper study of history would have saved the leaders from so fatal an error; they would have seen how often in the battles of Cromwell and Rupert the difference between rallying and failing to rally had meant the difference between victory and defeat. By thus getting out of hand the cavalry failed to be of any further use to their army for the rest of the day. They had made a night march the night before, had been saddled up for twelve hours, and had made three mounted attacks. This thoughtless and unnecessary pursuit put on the finishing touch, and completed the exhaustion of the horses.

At Leuthen the Prussian cavalry was divided into three principal masses, each of which brought off successful attacks against the Austrian cavalry. The following were the formations used:—

Of the 50 squadrons with the advanced guard under Prince Eugene, 30 attacked in first line, 5 delivered a simultaneous flank attack, and 15 followed up in support in second line.

Ziethen drew up his 53 squadrons with 23 in the first line, 20 in second line, and 10 in third line.

Driesen's attack is explained in the plan attached, which shows the situation at about 5 o'clock in the evening. At this hour, as it was beginning to grow dusk, 70 squadrons of Austrian cavalry, under Lucchese, formed in three lines, one behind the other, advanced to attack the left wing of the Prussian infantry.

Driesen was then in a position of readiness behind the Sophienberg, with 40 squadrons.

While his squadrons were resting, Driesen himself had remained constantly on the look-out and had carefully watched the whole course of the action. The ground all round his position had doubtless been thoroughly reconnoitred, and security

patrols posted in every direction from which attack was possible. When he saw the Austrian advance, Driesen wheeled to the left by squadrons, advanced, still under cover of the hills, sufficiently far to outflank the enemy, then wheeled into line to the right and attacked. His formation was 25 squadrons in the first line and 15 squadrons in the second line, while he detached 10 squadrons of Hussars round his left to attack the enemy in rear.

At the same moment Prince Eugene, who had also been carefully watching the fight, detached 30 squadrons from the reserve to meet the Austrians in front. This brilliant combination, a concentric attack of 80 squadrons, from widely different directions, and acting by surprise, was completely successful.

The Austrian cavalry were routed, and dispersed in wildest confusion. Again the leaders were to blame for the surprise, not a single patrol had been detached from this mass of several thousand horsemen. Their formation, too, of four lines, each directly behind the other, was faulty; it allows of no manœuvring of lines in rear, and leading lines if overthrown are driven back on the top of those following, often throwing them into confusion.

The battle of Lobositz is interesting as showing a mistake in the Prussian leading.

Old Field-Marshal Gesseler, who was in command of the whole cavalry, carried away by his eagerness, took part in the charge of the reconnoitring squadrons.

After defeating the cavalry opposed to them, these squadrons came under infantry and artillery fire, and were finally driven back in considerable confusion. The remainder of the Prussian cavalry, about 60 squadrons, then charged; Gesseler, who ought to have been commanding them, was engaged in endeavouring to rally individual squadrons defeated in the first attack.

This attack was entirely contrary to the intentions of the King, who was exceedingly angry when he saw what had happened: it ended in the defeat of the whole Prussian cavalry, a result entirely due to the want of appreciation of his duties on the part of the cavalry commander.

It is the business of the supreme cavalry commander to direct the operations of his *main body*, it is his duty to decide the attack formation, the direction of the charge, and the moment for deployment. When once the squadrons have been launched to the attack he can only further influence the fight by the use of whatever force he has retained under his own hand with which to meet eventualities. The rest must depend upon the skill and initiative of subordinate commanders.

Perhaps the most remarkable of all the achievements of the cavalry in the Seven Years' War, was that under Seidlitz, at the battle of Zorndorf. As a concise and excellent account of this battle is given by Colonel Maude in his "Cavalry: Its Past and Future," it will only be necessary to refer to it very briefly.

On this occasion Seidlitz charged and rallied three times with the same squadrons, a feat which later, for no sufficient reason, came to be looked upon as impossible.

In his first attack, made with 33 squadrons, he surprised the Russian right by crossing ground which they considered impassable, but which, as previously mentioned, he had carefully reconnoitred and prepared for crossing.

His first line consisted of 3 regiments of Cuirassiers, that is, 15 squadrons; each regiment had but one crossing place, and that so narrow as to compel them to form in columns of half-troops. Crossing in this formation, each regiment formed line to the front at the gallop and attacked. 18 squadrons of Hussars followed in support, and completed the success of the first line.

In his third attack Seidlitz was in command of 61 squadrons. Owing to the habit of the Russian infantry of throwing themselves on the ground to let the cavalry pass, and then rising to pour a fire into their backs, he determined to form in three lines, each directly covering the other, and at 250 yards distance. In first line, which he led himself, he had 18 squadrons of Cuirassiers, 15 squadrons of Dragoons followed in second, and 28 of Hussars in third. There was no panic, and the Russians received the charge with stubborn determination and steadiness. They were only finally defeated after a long and desperate hand-to-hand fight, their losses in the whole battle being about the heaviest ever recorded in history.

The Battle of Rossbach.

The Battle of Rossbach, fought on the 5th November, 1757, furnishes a striking picture, both of the supreme military genius of Frederick the Great, and also of the fighting methods of his army as a whole. No battle shows more clearly the different elements which formed its strength, and in no other do we see those elements working together in better combination. First we are struck by Frederick's boldness, both in strategy and tactics, his comprehensive grasp of the situation as a whole, and the lightning rapidity of his decision. Hardly less admirable are the skill and certainty with which he handled the three arms on the battlefield.

Considered as a cavalry study, it is impossible to watch better squadrons at work under a better leader.

Before describing the battle it seems desirable to say a few words on the subject of the cavalry leaders.

The names of Ziethen and Seidlitz are known to almost everybody who has heard of Frederick the Great. Certainly they stand out above the others, and Seidlitz was probably the greatest cavalry soldier that ever lived. But there are many more names scarcely less famous in Prussian history, and known to-day to every cavalryman in the German Army. Yet most of these men were by no means geniuses, some of them quite the

reverse. When Frederick heard of the brilliant attack of Driesen at Leuthen, which we have just described, he exclaimed in surprise: "What, Driesen, that fool?" and no one knew his men better than Frederick the Great. The fact is that a good system of training produces good leaders. Given such a system, and the opportunity for practice, men of quite ordinary ability can, if they will, fit themselves for the leadership of even large bodies of cavalry.

Seidlitz, at 17, had joined as a cornet a regiment of Cuirassiers, and at 20 took part with them in the First Silesian War. His first experience of the real business was in command of a troop of 30 dismounted Cuirassiers defending a village on outpost duty. Attacked by superior numbers of the enemy's Hussars, after some hours' defence with the rifle, Seidlitz found himself short of ammunition and determined to cut his way out on horseback. In this attempt his horse was shot under him and he fell into the enemy's hands. The King, who soon afterwards heard of his conduct, arranged for his exchange, and presently promoted him to a captaincy of Hussars. In 1752 he was made lieut.-colonel of a regiment of Dragoons, and in 1757 colonel of Cuirassiers. He had thus had experience of all three branches of the cavalry. The Seidlitz Cuirassiers were described by a contemporary as a "Pattern for the cavalry of the whole world; indeed, it is impossible to bring cavalry to a higher pitch of perfection than Seidlitz has brought this regiment."

A story is told of how at this time an anxious mother of a young Cuirassier came to remonstrate with the colonel about the dangers to which she thought her son was exposed. "I assure you, madame, there is no danger," said Seidlitz, "cats and cornets never break their necks."

Two days after the battle of Kolin, in which he had greatly distinguished himself, Seidlitz was made a major-general. When congratulated by old Ziethen on his promotion he said: "It was high time, Excellency, if they want to get anything more out of me; I am already 36." A few months later, on the morning of Rossbach, the King put him in command of all the cavalry present, passing him over the heads of two generals senior to him. "Gentlemen," said Seidlitz, on this occasion, "I have got to obey the King, and you have got to obey me."

At the time of the battle the position of Prussia appeared almost desperate. The North German allies had been driven back into Hanover by the French, a second French army was on the Rhine, the army of the Emperor on the march from the Maine to the Elbe, the Swedes were threatening an advance on Berlin, the Russians on East Prussia. All attempts to bring the Austrians to a decisive battle in Northern Silesia had failed.

As the only chance of success, the King determined to attack the now united French and Imperial armies.

On the 4th of November he found the allies in a strong position north-west of Rossbach, with an army of 90 battalions

and 84 squadrons, in all, 64,000 men; Frederick had 27 battalions and 45 squadrons, a total of 22,000.

Even Frederick thought the enemy too strong to attack in the position they had taken up, and he withdrew his army that night behind the little Leiha stream, between Bedra and Rossbach, hoping that the morning would bring him the chance of the battle which he needed. By two o'clock next day the King was on horseback, reconnoitring with Seidlitz and his Hussars. The allies, too, were early astir, and by eight o'clock were on the march towards the south, Seidlitz at once sending information to the King.

Knowing that the allies were short of food, the King at first thought they were retreating, and made preparations to overwhelm their covering detachments on the Schortau Hill and the Galgen Berg. When, however, on reaching Zeuchfeld their main columns changed direction to the east, he at once determined to attack them. Orders were issued for the army to march off from its left and to move eastwards behind the Janus Ridge.

The allies, whose intention was to cut Frederick off from the Saal, took his movement to be an attempt to escape by Merseburg. They therefore hastened their march, and the cavalry pushed on some 2,000 yards in front of the rest of the army.

The Prussians, leaving seven squadrons of Hussars and one battalion near Schortau, moved off eastwards behind the Janus Ridge, the cavalry under Seidlitz trotting on in front.

Only a few minutes before moving off Seidlitz was put in command of the whole cavalry. His first act was to assemble his officers and explain his plan, which was to move under cover of the Janus Ridge, and, using the Janus Hill as pivot, to attack the heads of the enemy's columns. He moved off in a double column of squadrons, taking rather more than wheeling distance in order to give a broader front when he wheeled into line, as he knew the enemy greatly outnumbered him.

His right was covered by the Székeley Hussars on the Janus Ridge; making good use of their carbines, they secured his pivot of manœuvre and effectually prevented the enemy's patrols from watching his movements. He himself, with his staff, and perhaps some of his leaders, rode along the ridge keeping the enemy in view.

Seidlitz seems to have preferred columns of squadrons to the heavier and denser formations, such as mass or double column of troops, and doubtless found that it had many advantages. Being more elastic there was an avoidance of checking, lengthening of the column and bumping whenever obstacles had to be crossed, the increased distance between ranks gave the horses room to jump, there was less trouble from dust, leaders could see better and horses got more air.

After passing the Janus Hill Seidlitz changed direction half right, and then, still under cover, wheeled into line to the right

and halted. He formed up in two lines, 15 squadrons of Dragoons in the first line, 18 squadrons of Cuirassiers in the second line, covering a front of 1,300 to 1,400 yards. The Székeley Hussars, having finished their task of protection, had rejoined the main body, and were now in the third line a few hundred yards on his left rear.

By the time the cavalry had reached the Polzen Hill, Frederick had got 18 heavy guns on the Janus Hill, and now opened a sudden and effective fire on the hostile cavalry, throwing them into considerable confusion. Seidlitz was watching for the opportunity, and when the enemy's cavalry were within about 1,000 yards he gave the signal to attack. The enemy were completely surprised; their deployment was hampered by the road cutting—a serious obstacle—10 to 12 feet deep, and practically forming a defile 700 yards broad immediately in front of them, and the fall of the ground was also in favour of the Prussians. In addition, the artillery on the Janus Hill were able to continue effective fire up to the moment of actual collision.

Amidst the praises heaped upon the Prussians, the prompt action of the French battery, which was engaging the guns on Janus Hill, is apt to be overlooked. Directly the Prussian cavalry appeared over the ridge the battery commander turned his fire upon the charging squadrons, and was able so effectually to influence the result that the first collision proved indecisive. Seidlitz's first line was met by two Austrian regiments, and the result was one which is most unusual in cavalry charges. Both sides rode home, but no part of either was able to break through the other—a proof of equal daring and determination and equal cohesion in the ranks.

Seidlitz, who personally led his second line, now launched it to the attack, and the Székeley Hussars simultaneously attacked the enemy's right flank. The whole thus brought off a converging attack as shown in Plan I. of the battle, which resulted in the enemy's squadrons being overthrown and put to flight. Meanwhile 24 more French squadrons had arrived, and now attacked the Prussians on both flanks. While only a few Prussian squadrons had pursued the defeated Austrians, the remainder had rallied, and were in consequence quite ready to meet the new attack. They now charged again, overthrowing the French cavalry and capturing the French battery. The whole allied cavalry then turned and fled.

Seidlitz, who had been wounded in the fight, at once called off his squadrons from the pursuit, quickly rallied them behind the hollow road, and then moved to a position of readiness near Tagewerben. Here, completely hidden by the ground, he again formed up in two lines and took the opportunity to rest his horses, ready at a moment's notice to intervene in the main battle or to launch his squadrons in pursuit. He himself remained on the lookout watching the course of the action.

Meanwhile the Prussian infantry, having completed their deployment behind the Janus Hill, advanced to the attack. The allies were completely surprised, and the fire of seven battalions in conjunction with the artillery sufficed to throw them into considerable confusion.

On seeing the enemy thus disordered, Seidlitz again sounded the charge, and, riding over their few remaining squadrons on his way, crashed into the flank of the hostile infantry. Panic at once became general, and the whole allied army broke into flight. The Prussian artillery continued to fire on the retiring masses as long as light lasted, and the infantry pursued as far as Obschütz. The cavalry, who had done a very hard day's work, were called off when darkness fell.

The King's dispositions for the night should be noticed: While the infantry bivouacked on the high ground between Obschütz and Markwerben, the cavalry were withdrawn behind them and put into billets in Reichswerben, Tagewerben, and Storkau. While the casualties of the allies amounted to 650 officers, 9,500 men, and 72 guns, the Prussian losses were only 30 officers and 518 men killed and wounded, 4 generals, including Seidlitz, being among the latter.

The infantry fight had only lasted 15 minutes; two Prussian battalions had expended from 12 to 15 rounds each, 5 others a few less, while the remainder had not fired a shot.

Next day the army moved forward in pursuit, and by the evening of the 8th the cavalry reported that the whole country this side of the river Gera, 50 miles from the battlefield, had been swept clean of the enemy.

The chief credit for this amazing victory belongs, of course to the King. His was the big decision, his alone the responsibility. His conduct of the battle shows the highest possible skill in the use of all three arms combined. He knew where to retain personal control, where and to what extent to give his leaders a free hand. The discipline of the troops, too, and the skill of the leaders, cavalry as well as infantry, were the results of his ceaseless efforts. Nothing can show more clearly the effect of his training than the mere possibility of manœuvring as a single body a mass of nearly 40 squadrons handed over to a new leader on the battle-field itself.

Seidlitz and his cavalry require no further praise; their performance remains as a model of perfection to all times. It must, however, always be remembered that under another Commander-in-Chief they would probably have found themselves covering with dismounted fire the Prussian retreat to the Saal. In Seidlitz's handling of the cavalry his self restraint was quite as important a factor as his magnificent dash. The charges were well timed and well carried out; squadrons well closed, mutual support of all three lines, combination of front and flank attack, and above all *surprise*.

The whole battle shows the most admirable co-operation of the cavalry with the rest of the army, and the perfect control which the leaders exercised over their troops.

Concluding Remarks.

During the first and second Silesian wars the main strength of Frederick's Army had lain in the infantry, and it was only in the Seven Years' War that the cavalry were able to perform their fair share in deciding the issue on the battle-field. This fact shows that their early failure and subsequent success was not a question of the firearms of their enemy, but depended entirely upon their state of efficiency and the skill or want of skill in the tactical leading of the officers.

A charge against unbroken infantry, fresh and ready to receive it, no more promised success in those days than it does to-day.

We need not wait for the days of magazine rifles and Q.F. guns to find instances of such failures. There are several in the battles we have been considering.

In one important particular, indeed, the odds against the cavalry were greater then than they are at present. In the time of Frederick, infantry in line three deep could fire thirteen shots a minute per yard of front, and the projectile was an 8-bore bullet, which brought a horse down in a single stride. The small-bore rifle of to-day has very small stopping power in comparison, and I have myself seen a spring buck shot through the heart with a Mauser bullet travel over half a mile before it stopped and fell dead. It will take many such bullets to stop a line of charging cavalry determined to reach the firers, cost what it may.

But war does not consist of isolated duels between the different arms. It is by the close and effective co-operation of all three arms that battles are won, and the value of cavalry on the battle-field depends upon the skill with which its leaders can take advantage of situations created by the other arms.

In the future as in the past, leaders will sometimes make mistakes, precautions will be neglected, troops will become exhausted and demoralised. That "the long-fire fights of the present are more destructive of the moral and physical energy of the infantry than the close-quarter conflicts of the past" is amply demonstrated by the events of the recent war in Manchuria.

The Austrian, Captain Spaits, in a recent book, gives his personal experiences of the Russian retreat from Mukden. He describes the terrible condition of the crowds of fleeing soldiers, many of them weaponless, and all vestiges of discipline vanished. When these masses of fugitives, horse and foot mixed together in hopeless confusion, hungry and frozen, reached the Puho River, a block occurred owing to difficulties in crossing. About three o'clock in the morning part of an ammunition column,

fleeing from the Japanese, broke at full gallop into this mass of shivering humanity, upon which the wildest shooting began in all directions, and the most complete panic set in.

"At such moments," to quote Captain Hoeing, "it is quite a matter of indifference whether these remnants carry a repeating rifle, a flint musket, or a pitchfork, for the men's nerves are overstrained and their weapon counts for nothing."

All campaigns, especially the latest, furnish examples of such demoralisation, and prove the utter fallacy of statistics based on rifle range experience.

To again quote Hoeing: "If battle-fields were simply rifle ranges, then the effect so generally attributed to firearms to-day would certainly be due to them. Battle-fields, however, are not rifle ranges, but a confused mass of heights and valleys, of fields and ravines, of woods and villages, which give to each arm a field for its action, provided, of course, that the arm is capable of manœuvring in such country."

The moral of this seems to be, first, that the cavalry leader must be a tactician, and must study the other arms in order to be able to recognise the opportunities which will inevitably occur; and secondly, that he must know and have confidence in the capabilities of his own arm and develop to the utmost its tactical knowledge, its speed and manœuvring power. By this means only will the cavalry be able to act by surprise, and thus make the most of the possibilities which the future certainly has in store for them—possibilities even greater than those which the Great King and his leaders knew how to turn to such glorious account.

Colonel F. D. V. Wing, C.B., Staff Officer for Royal Horse and Field Artillery (Aldershot Command):—This admirable lecture has brought out some very interesting points, to one or two of which I should like to refer. There is one point in Frederick the Great's campaigns which is especially worth noticing, namely, that in these campaigns the inauguration took place of any methodical co-operation of artillery with cavalry. The artillery in those days was very much hampered by being non-mobile. Major Greenly has told us how Frederick the Great improved the mobility of his cavalry, and he no doubt greatly improved the mobility of his artillery as well. In the battle of Rossbach, in one of his later campaigns, the co-operation of the artillery and cavalry was especially noticeable, when 18 guns were sent forward to an advanced position, where they could fire at the advancing column of the enemy's troops. They were used apparently as a pivot of manœuvre by Seidlitz, who worked round on the flank and attacked the column with such success that he rode through it four times, and commenced the great Prussian victory which was gained on that day. It is very likely that Frederick the Great from the success on that day inaugurated two years later (1759) the horse artillery—an example we did not follow till 1793. Though our guns have improved enormously since those days, I think the tactical action of horse artillery and cavalry is very much the same now as it was then. There is no doubt that they must reserve their long-range fire for those many occasions when they will be used as field artillery, and the horse artillery, when acting with

cavalry, must make up their minds to get up at all hazards to a position where their fire will not be masked, and whence they can fire direct and accurately on to the enemy's advancing squadrons up to the moment of impact. Lessons from these campaigns of 150 years ago are very excellent studies for us now, and we are very much indebted to Major Greenly for his able lecture.

Major G. W. REDWAY:—I think those who have most studied the subject of tactics in the 18th century will be best able to appreciate the very able lecture to which we have listened. I have studied the subject somewhat during the last few years, and having followed the lecturer very closely, I noticed that Major Greenly has gone greatly into detail, and I hope that when the lecture is published he will be kind enough to quote his authorities for some of these details, which are not found in any general history. That brings me to the point on which I wish to say a few words, and that is the question of deployment. The word "deployment" has been used twice by the lecturer, instead of an expression which I expected would occur often in his lecture, namely, "wheeling into line." I should very much like to know whether Major Greenly has found any evidence that "deployment" was known and practised by Frederick the Great. We are generally under the impression that deployment, which was the special feature of the later French revolutionary system, was invented by the Frenchman Mesnil Durand, and that in Frederick's time battle formations were based on wheeling into line from the pivot flank, that is, the "directing" flank of the column. It is a very interesting point, and a vexed question among students, and if the lecturer has discovered any evidence that infantry and cavalry formed line *to the front* in those days, one would like to know something about it. Even so late as the Crimean period Captain Nolan, of Balaclava fame, in his wonderful book on cavalry, which the lecturer probably knows, shows that the old "right in front" or "left in front" conditions for manœuvring were still in vogue, and he loses no opportunity of ridiculing the system. If in Frederick's time the military world did know anything about "deployment," that is, the unfolding of column into line, the forming line *to the front* as distinct from wheeling into line *to the flank*, it would be interesting and valuable to have evidence of the fact. Another point the last speaker alluded to, and that is "horse" artillery. It was on an occasion in 1759 or 1760, towards the close of the Seven Years' War, and during a cessation of hostilities that Frederick wanted to engage in a strategical reconnaisance, and since he could not take infantry with him, he organised a mounted force. He also wanted to take guns with him, and knowing he could not have foot artillerymen, he mounted his gunners. I think that was the earliest experiments in what we call "horse" artillery, and it was used in connection with strategical reconnaissance, which is the particular point I want to emphasise. The only other thing I wish to refer to is a question of what I suppose we still call Grand Tactics. I think the lecturer did not perhaps sufficiently emphasise the fact that, according to the general histories of the subject, Frederick utilised his cavalry as a means of gaining manœuvring power at a time when infantry was singularly immobile. Owing to the so-called "linear tactics" which then prevailed, if you once got a body of troops in column of companies you could only form line in one way, and when you got infantry into line you could not shift them to either flank without again wheeling the

companies into column. That is what I have gathered from what I have read, and how Frederick secured his great successes was by taking advantage of this curious habit of anchoring infantry to one spot. As Hamley says: "He walked round the Austrians like a cooper round a tub." But he did it by means of mounted troops. He could not utilise his infantry for such a purpose, because they also were immobile under the conditions of training at that period. In later days cavalry's mission was said to be that of sacrificing itself to gain time for hard-pressed infantry. Frederick had no such ideas; he used the cavalry as his arm of offence. He won his battles with his mounted troops. I think that might be more emphasised in the lecture. I do not think more need be said, except in high praise of Major Greenly's lecture. The difficulty of all lectures at this Institution is that the better the lecture the less room there is for discussion. That is the unfortunate situation to-day.

Brigadier-General Sir H. S. RAWLINSON, Bart., C.V.O., C.B., Commanding 2nd Infantry Brigade (Aldershot Command):—I am rather diffident of speaking on this subject amongst so many cavalry officers; but with regard to the view expressed by the lecturer as to cavalry training for cavalry officers, I think we shall be all in agreement. There is one point, however, which I would like to emphasise, and which has to some extent been omitted by Major Greenly. We all agree with the necessity for the most careful training in leadership by squadron, regimental and brigade commands, and nothing is better teaching for them than the study of history and the tactics employed in the various actions which Major Greenly has described to us. But there is another point in this connection which I think cavalry officers should thoroughly appreciate and know, and that is the immense importance and value of ground. The study of the value of ground and a quick eye for country are important matters for any officer, but they are absolutely essential to cavalry leaders on the battle-field, where rapidity is of the essence of success. To visit past battle-fields, where cavalry actions have taken place, and there to realise the undulations of terrain which were the prime cause of the various movements that were made, furnishes, I think, the very best teaching for both cavalry officers, as well as for officers of other branches of the Service.

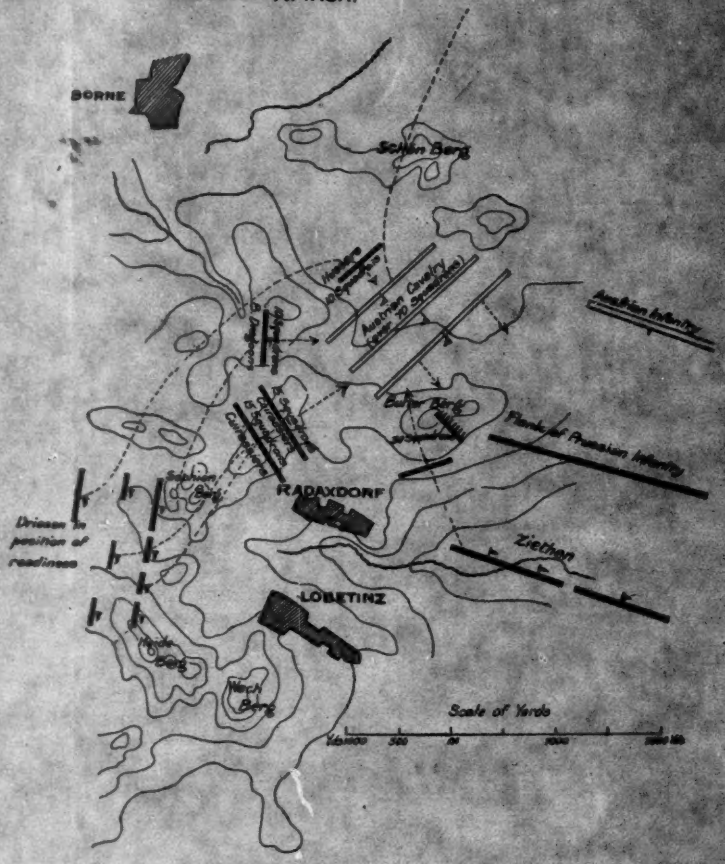
The CHAIRMAN (General Sir J. D. P. French, G.C.V.O., K.C.B., K.C.M.G., Inspector-General of the Forces):—I am very sorry that no more cavalry officers will speak on this great subject. I therefore propose to say a few words, generally reviewing what has been said, and expressing an opinion on the points which I think we should most usefully attend to with regard to the lecture. All who have the efficiency of the cavalry service at heart—and I will go further and say all who desire to see the British Army maintain its great traditions in the field—must feel deeply indebted to the lecturer who has so ably and concisely put before us the fundamental principles upon which alone cavalry can be successfully employed in war—principles of everlasting truth and steadfastness which were first preached and practised by one of the greatest warrior monarchs the world has ever seen. When I say Frederick was the first exponent of these principles, I am not perhaps strictly accurate, for the lecturer has himself referred to the achievements of Cromwell's cavalry, and no doubt if we go back to days even more remote we shall find the same spirit animating successful

cavalry in war. The lessons we can learn from this lecture are so numerous and so weighty that it is difficult in commenting upon them to give prominence to one more than another; but in reviewing the subject I should be inclined to base the whole discussion upon those pregnant words which follow the lecturer's remarks on the battle of Leuthen, on page 1309, taken in conjunction with Frederick's instructions to his cavalry on page 1304. These paragraphs run as follows: "Information of any value had to be fought for then as it has to be fought for now; great cavalry fights took place in the endeavour to gain information, and heavy prices had to be paid before it was obtained. Our "Cavalry Training" clearly lays down that the ultimate objective of our independent cavalry is to discover the enemy's main columns. The first obstacle will usually be the enemy's independent cavalry; but when that has been defeated there will still remain a second obstacle—the protective cavalry—which will have to be pierced or thrown aside before the information can be obtained." "These cavalry fights were not in the days of Frederick any more than at present, the object in themselves; they were and are the means—and the only means—by which the end of obtaining information can be gained." Then amongst Frederick's instructions comes this very important one: "Squadron commanders are made responsible that not a man uses carbine or pistol in the mounted attack; the enemy is to be ridden at sword in hand." The ability to beat the hostile cavalry opposed to him must ever be the first consideration in the mind of one who aspires to lead cavalry in war; and why is this? Because then, and not till then, a field of enterprise will lie open to him which is incalculable in its possibilities, and endless in its far-reaching results. I should like to quote here the remarkable words of one of the ablest writers on military subjects of the present day. Colonel Kiggell, in the revised edition which he has published of Hamley's "Operations of War" says: "It is true that new inventions have necessitated a perpetual development in tactical method, but history shows clearly that all successful tactical methods have been based on great fundamental principles which are as changeless as the human nature on which they depend." Another writer on the same subject says as follows: "It is quite true that the introduction of improved arms has produced very considerable modifications in the method of fighting, but these modifications are not so changed as the growth and development of principles that have been known for hundreds of years. And it is the most dangerous thing to ignore all experience obtained prior to the introduction of improved arms, for it is only by a careful study of the development of tactics that the true direction in which improvement is possible can be determined." In view of the doctrine expressed, established and practised by all great military Powers of the world, that the only main elements in a cavalry fight comprise the man, the horse, the sword and lance, with what force do these extracts from military writers of great ability, who are not horse soldiers, come home to us as cavalrymen? I should commend, then, cavalry soldiers to search this lecture and the history of the times to which it refers, in the first place, to learn how cavalry can be best prepared to overthrow their enemy in the field. The lecturer tells us clearly where to begin and how to proceed, in putting before us the instructions of the great King, and how at Leuthen and Rossbach the peace practice of these instructions bore fruit. They were to begin with the individual man and horse, then the troop, the squadron, the regiment, and the brigade were to be progressively

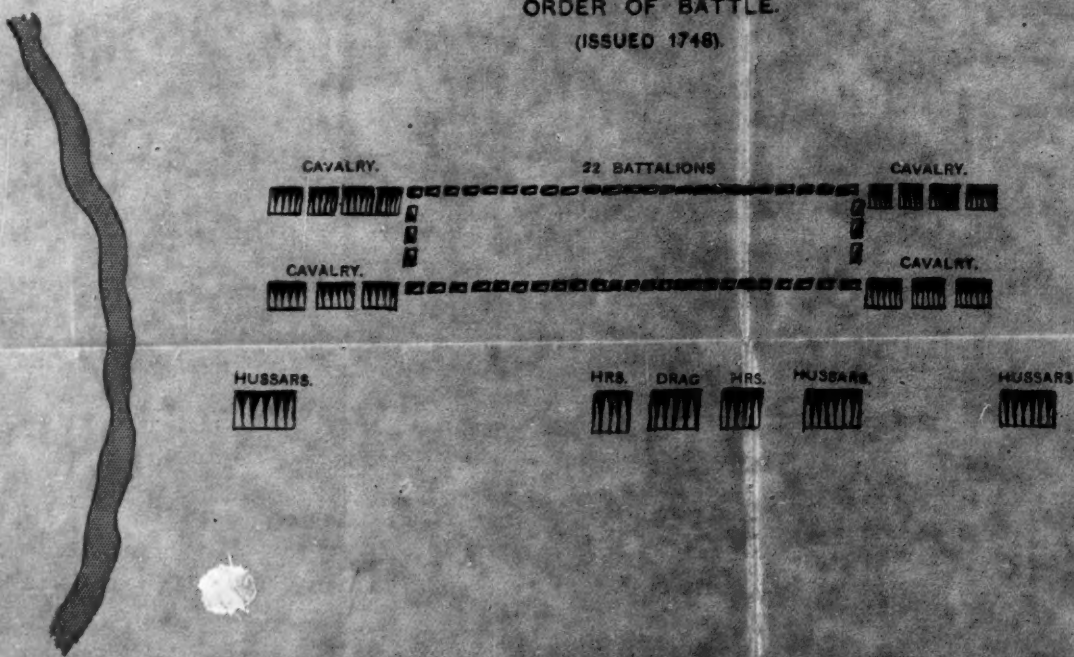
and successively brought to efficiency and perfection, and finally, the keynote of all was to be a mutual understanding permeating throughout the whole force. These instructions were obeyed to the letter, and with what result? The attainment of such mobility and manœuvring power as enabled large bodies of cavalry to intricately manœuvre in secrecy and under cover of hills and features of ground, to ensure a sudden deployment and surprise, and the almost immediate rout of the immobile, unwieldy Austrian cavalry. The lecturer has pointed out very clearly to us that Frederick never tired of telling his generals that this primary *rôle* of cavalry is but a means to an end. The hostile cavalry is defeated and driven from the field. What then? The same dash, the same energy, the same endurance, but combined on the part of the leaders with a profound and far-reaching knowledge of strategy and tactics, and the higher art of war, and on the part of the troops a thorough training in musketry and efficiency in the use of the rifle. I have always held that the *rôle* of cavalry, when victory over its own arm has made the road clear to its enterprises, is summed up in three words—reconnaissance, deception, support. We have heard that the cavalry in the time of Frederick was somewhat deficient in the practice of far-reaching reconnaissance. May not this well have been because its leaders were not profound students of the higher art of war, a knowledge of which alone can enable mounted troops to direct their researches so as to make the most important and valuable discoveries, and effect the most thorough clearing of the fog of war? Let cavalry leaders remember this, and understand that to be of real use to the Commander-in-Chief they serve they must themselves possess the knowledge and education—only to be acquired by close study—to enter into his plans and justly appreciate the military situation on both sides. The idea of surprising the enemy is the very spirit and life of Frederick's instructions; but to surprise we must know how to deceive. What said Stonewall Jackson? "Always mystify, mislead, and surprise your enemy"—one of the principles which Henderson describes in his "Science of War" as "the foundation and crown of all strategical method." Now, I am one of those who believe that an enormous field of useful work is open to leaders of mounted troops in this work of deception and consequent surprise. But here again a most intimate knowledge of battle-field tactics is essential, and I earnestly commend this study to cavalry leaders. Given this knowledge, many kinds of ruses can be studied and thought out which only require constant peace practice to be effectual in war. Then the immense mobility of a highly-trained cavalry renders its power of bringing speedy succour and support of immense value, whether strategically in the theatre of war or tactically on the field of battle. The rifle now in the cavalryman's hands will render this support of infinitely greater value than formerly. Whether we consider the cavalry fight, or the enterprises which its successful conduct opens up, it is the true cavalry spirit which must ever be the corner-stone of all instruction and preparation, and it is this cavalry spirit which breathes through every line of the admirable lecture which we have heard this afternoon. Finally, I should like to draw particular attention to the vivid picture which the lecturer has drawn of the Prussian army, assailed on all sides by vastly superior numbers, and securing the victory against tremendous numerical odds by their superior training, efficiency, and knowledge of war. These constitute some of the principal factors in the *moral* of an army. We all remember Napoleon's great dictum, that in war the moral was to the physical as three to one. Had

Napoleon lived in these days I am inclined to think he would have increased his estimate in favour of the moral factors in estimating their relative importance. To us soldiers of the British Army, who may also find ourselves assailed by vastly superior numbers, the example of the great Prussian King and his army furnishes a special lesson. Let us do our best to profit by it, and increase to the utmost those *moral* factors of which I have spoken. In conclusion, I am quite sure I shall be only anticipating all your wishes if I express our most grateful thanks to Major Greenly for the admirable lecture he has given us.

LEUTHEN.
DRIESEN'S ATTACK.



ORDER OF BATTLE.
(ISSUED 1748).



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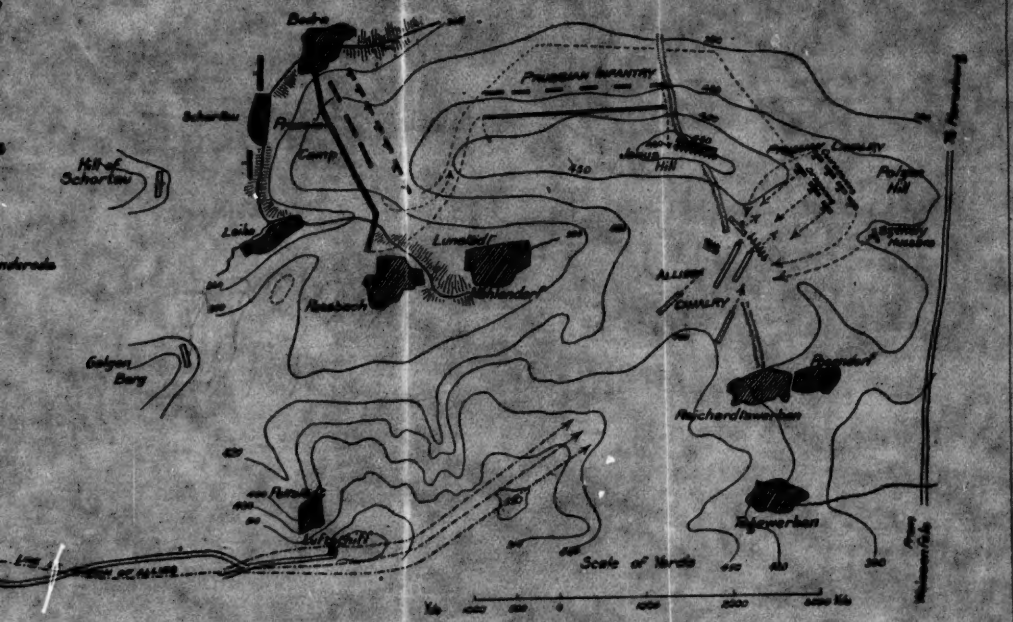
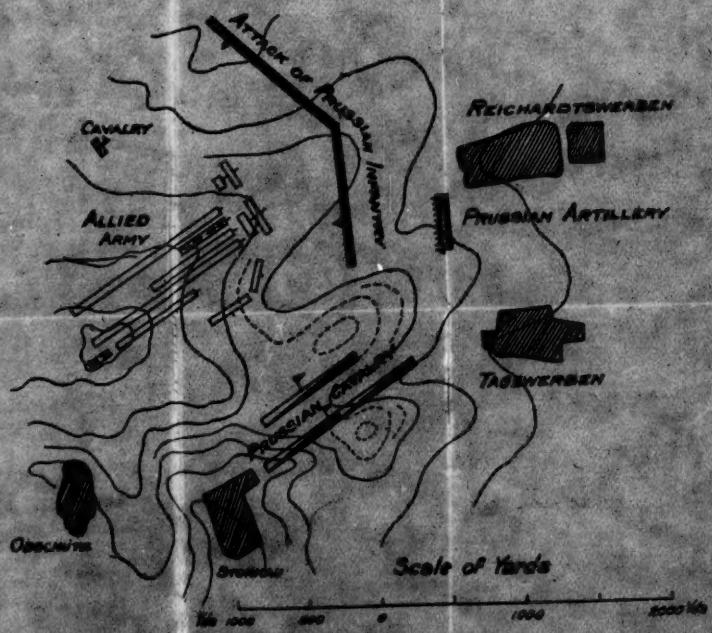
I

BATTLE OF ROSSBACH
SEIDLITZ' 1st ATTACK.



II

BATTLE OF ROSSBACH
SEIDLITZ' 2nd ATTACK.



RASPLATA.

("THE RECKONING.")

By Commander VLADIMIR SEMENOFF, Imperial Russian Navy.

Translated, by permission of the Author, by L. A. B.

Continued from September JOURNAL, p. 1189.

CHAPTER VIII.

"MUCH ADO ABOUT NOTHING"—THE CRUISE OF 23RD JUNE—"GOD HAS HELPED US"—THE UNEXPECTED RETURN—THE BEGINNING OF THE END—AGAIN THE OLD GUARD DUTIES—THE CRUISER IN THE ROADS—SUPPORTING OUR TROOPS FROM SEAWARD.

ON the afternoon of 18th June the greatest activity prevailed throughout the harbour and the basins of Port Arthur. The men-of-war hauled their bows round towards the channel leading out, tugs were taking our transports into the corners of the basins, so as not to block the fairway; here coals were being taken in, there stores or provisions. Floating cranes were lifting the buoys and moorings which had been laid out temporarily; yard craft were removing the second and third booms. The fact that our squadron was to go to sea was an official secret, but all this animated scene proclaimed it aloud. Even a landsman was bound to notice it. It was enough to make one lose courage; I should have liked to cry out aloud: "My friends, why all this to do?"

On 20th June high water was at 2 p.m. All preparations for going to sea could have been completed by then if commenced at daylight. Did "they" not know what was common knowledge in the squadron, in the port, in the town, in the fortress? Did "they" not know that the Japanese were accurately and immediately informed of our every step, every movement? Did "they" not know that the Japanese invariably had knowledge of the plans and intentions of our leaders, thanks to our "bureaucratic" methods in treating secrets? Why, the Japanese were often better informed than we officers, who were reduced to guessing.

Since that strange midnight encounter of 15th June the Japanese had completely disappeared. Our mine-sweeping flotilla cleared a channel to the S.S.E. and buoyed it without any interference on the part of the enemy. The searchlights were diligently worked but could not discover anything suspicious during those nights. When the channel was searched once more to make doubly sure, no new mines were to be seen. The Japanese minelayers had quite given up operations in our roads. It looked as if we really might hope to surprise the enemy, if we went out unexpectedly. Perhaps their main body was off Vladivostok; perhaps they were so firmly convinced that we would undertake nothing, that their ships were taking in supplies, making good defects, or simply resting in Japanese ports. Such Japanese vessels as had been left behind to keep up the blockade might have gone into some bay (their flying base) to coal. Who could know?

In any case it appeared to me to be perfectly incomprehensible that our very obvious preparations had been begun several days before the date of sailing. But worse was to follow. At 5 a.m. on 20th June the *Sebastopol* and *Poltava* received orders by signal to raise steam; these two ships had cylindrical boilers; at 7.30 a.m. the same order was signalled to all other ships. Then came the general signal: "Prepare to sail at noon."

Soon after 8 a.m. a hectographed order reached us; in it the Admiral communicated the happy intelligence that the repairs on the damaged battleships were completed and that the entire squadron was once more ready for sea. He then called upon God and the Heavenly Hosts, and declared that we would now go to sea and once more start active operations.[1] At the same time was published a special number of the *Novy Krai*, a newspaper which appeared regularly in Port Arthur. In this number the above-mentioned orders were printed as a sensational piece of news. It was clear the editor had certain connections which permitted him to obtain a copy of the order the evening before.

At 10 a.m. the admirals and captains were suddenly summoned to the *Tsesarevitch* (flagship). At 10.20 she hoisted the general signal: "Let fires die out."

"What is it"—"What has happened?" the officers asked me, surprised and scared.

"I don't know; wait till the captain is back, he will be able to tell us."

Meanwhile, steam-boats were going from ship to ship calling in again the above-mentioned order; we were ordered not to register it. At the same time a perfect army of orderlies

[1] Is it not remarkable how closely this order resembles the solemn Army Order, in which General Kuropatkin announced the beginning of offensive operations?

rushed through the town and all over the harbour to confiscate that fatal number of the *Novy Krai*.

The torpedo lieutenant was beside himself with rage. "Quite useless," he mocked; "the Japanese have already read the order—probably they had a proof sheet."—"Much ado about nothing," grumbled the paymaster; he had always taken a pessimistic view of things.

Our spirits could not have been at a lower level than they were.

The captain returned; we gathered that "they" had thought better of it at the last moment. The day had been an unfortunate choice, it was said, as high water was in the afternoon. No sooner had the squadron got out, than night would have been upon us, and with it the risk of torpedo attacks. It had been decided to wait two or three days until high water came at daylight; then in God's name we should make an early start.

"Oh, is that it?" I could not help saying; "but why had all this to be 'piped at the main hatchway?' What capital chances we should have had if we had gone out suddenly."

The captain tried to be jocular: "It is easy to be wise after the event," he said; but somehow it did not sound very convincing.

In my diary I wrote: "We are waiting for the Japanese to inform us that they are aware of our intentions; why, we are simply provoking them. At 9 p.m. on 21st June we get a circular to the effect that ships are to be ready to sail at 2.30 a.m. on the 22nd; towards midnight, the signal—'Sailing postponed.'

"At 2 a.m. on the 22nd Japanese destroyers appeared in the roads; we could congratulate ourselves: they had been waiting for us. Everything that could, fired at them. Now we could recommence our mine-sweeping.

"Towards 2 p.m. Liao-ti-shan reported a squadron of cruisers and destroyers in sight. Very disagreeable. The buoyed channel to seaward was swept for mines—it was clear. Curious!

"The *Vsadnik*, *Gaidamak*, and eight destroyers were sent out for the night to guard the roads; why wasn't a cruiser sent out as guard-ship? Why? Towards 10 p.m. we heard guns outside. The Japanese had again appeared, but our destroyers had attacked and driven them away. Our losses and damages were insignificant, only the *Boyevoi* had a biggish hole. We are definitely to go out to-morrow. 'God grant a happy issue!' as Makaroff used to say."

At 4 a.m. on 23rd June we started moving out; it was just beginning to get light; orders were given for all ships to anchor outside until the whole squadron was out and the mine-sweeping flotilla ready to precede us. The order for anchoring prescribed the following:—We were to pass the sunken ships, the booms and mines, then turn sharp to port (east) and anchor in order of fleet numbers in two columns close outside our line of mine

defences. The Japanese mine-layers had hitherto not risked coming as near as that to the water batteries—at least no Japanese mines had been found there up to date. The *Diana* was lying in the entrance; she was the first to go out, the *Novik* at the same time. Then followed the battleships and cruisers just as they lay nearest the entrance.

When we had reached our billet (the furthest east) we dropped an anchor. The assembling of the squadron was bound to take two or three hours. We therefore sent our men to breakfast, and gave them free time to rest and gather strength for the heavy day before them. Far away, bearing S.S.E., hostile torpedo craft hove in sight from time to time. We—that is, the officers—were on the point of going down to the mess when we heard a shout from the bridge—"Mine astern!" In fact, less than 100 sachen [about 200 yards] astern of the *Diana* a Japanese mine could be seen just under the surface, distinguished by the chain slings on the lid. A section of the small-arm men were ordered up to destroy it.[1]

"Just as well we did not keep a little more to port in taking up our billet," said the captain, and stroked his beard as was his custom. "That might have been a nice business."

"Yes; and lucky, too, that the mine came to the surface," I replied in the same tone. "Swinging whilst weighing we might easily have struck it."

The *Tsesarevitch* was just coming out of harbour; she suddenly turned short and stopped. "Mine just floated up under the flagship's bow!" shouted a signalman.

The *Peresviet* had already anchored. We suddenly heard rifle-fire from her direction. She, like ourselves, was evidently firing at mines.

The ships came out one by one with the greatest caution. Each one tried to follow exactly in the wake of ships which had already come out. Every one anchored as soon as possible. Whoever chanced to get a few yards too much to the right or the left might hit a mine. There were sure to be some which had not come up, but still floated at the right depth. Naturally, there was no question of adhering to the plan of anchorage.

Towards 9 a.m. we had counted five mines awash.

"How lucky for us that the Japanese had moored them so badly," the captain said laughingly. "They are all coming up."

"Five have come up, but how many more are there?" said the torpedo lieutanant.

The flagship signalled: "Hoist out steam-boats and search the water between ships."

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[1] A rifle bullet or small shell only produces a little shock; consequently the mine does not explode, but a hole is made in its shell. Through this hole water pours in and the mine sinks, that is, lies on the bottom, where it is harmless.

The mine-searching flotilla came out and swept the water further seaward (that is, from the squadron). They found nothing; but amongst the ships a rich haul was made. By noon ten or eleven mines had either been exploded on being hooked or floated up and destroyed by gun-fire. One exploded thus quite close to our stern; it was 20 to 30 yards off. When the water which had been thrown up by it came down again, all who were standing on our poop got a cold shower bath.

On each side of us the water was free. The squadron had anchored exactly on top of the mine-field.

"How is it possible for us to have run along all those mines and never to have touched one?" was the general question.

The men said, "God has helped us"; many took off their caps and crossed themselves.

To-day nothing was heard in the mess in the way of a joke at the Japanese failure. Every one was silent: some looked as if they had something on their minds which they dared not speak of aloud. I believe that we were all depressed by the same thought. These mines must have been laid yesterday or last night, for everything hereabouts was clear of mines until then. It was quite possible our people had not kept a sharp lookout, and had never noticed anything, but why were the mines placed just here? Why precisely at the place where the squadron was to anchor? Did the Japanese by any chance know our most secret "plan of anchorage"? Surely this could not be—yet the fact remained.

"A very stupid business," said my neighbour, the gunnery lieutenant, quite suddenly; nothing more.

All were silent; no one asked why it was such a stupid business.

Noon.—The mine-searching flotilla is still steaming backwards and forwards, sweeping the channel seaward. Far away on the horizon we can make out some Japanese destroyers. Time passes quickly.

The officers had already begun to make sarcastic remarks about our exit: "No doubt we are only waiting for the next high water to go in again. We are certainly not going to sea just before dark."

Officers as well as men in our ship had hardly got any sleep the previous night, and since 3 a.m. every one had been on his legs. Yet no one used this pause to get some rest. Every one was moving about furious and impatient. "Of course we are going back again—we are to be locked up again for a month"; that was the kind of talk one heard amongst the various groups about the deck.

Suddenly, at one o'clock, the flagship began reorganising the squadron by flags. This acted like a warm sunbeam. Every one cheered up and plucked up courage. The younger officers became so enthusiastic that they called for champagne. One of the youngest members held up his glass and began to recite a passage from *Borodino* [by the poet Lermontoff]:

"What are we to do? Go into winter quarters? Are our leaders afraid of tearing the enemy's coats with our bayonets?"

At 1.40 p.m. a *Te Deum* commenced, but I was unable to attend, as at 1.50 our signal went up to weigh. *Diana* was the first ship to do this. We were to get to sea and avoid as far as possible the Japanese mines. Therefore the following procedure was ordered. The mine-sweeping flotilla was to lead out, steaming by subdivisions. Then followed three subdivisions of the second destroyer flotilla, also towing sweeps; then in single line ahead *Diana, Askold,* all the battleships, *Bayan* and *Pallada*. The *Novik* and first destroyer flotilla, which were attached to the squadron, received orders to proceed out independently. We moved ahead very slowly, that is, at 6 knots. At higher speeds the sweeps floated up.

We were all in excellent spirits. At last we had resolved upon something. If we are now to go down, it will at least not have been in vain. It is merely a question of getting at the enemy and sticking to him.

"*We* shall burst up in any case," the torpedo lieutenant observed in an argumentative tone. When we all went for him, he continued: "*Diana* leads the line; she will therefore be the first in action; we shall also hit the first mine which has escaped the sweeps. But if we *don't* hit a mine, then the *Diana* will burst from mere pride at the great honour of leading the squadron."

The torpedo lieutenant was evidently rather pleased with his *bon mot,* at which we all laughed heartily.

At 2.35 the Japanese destroyers were cheeky enough to fire at our mine-sweepers. The *Novik* and her destroyers were sent after them. The *Diana* also opened fire on them with her 6-inch guns over the heads of our own vessels. Firing went on for about a quarter of an hour. When the Japanese realised the uselessness of their performance they steamed away at full speed to the south-east.

Our chaplain, Hieronomach [monk and priest] Gavril [Gabriel], had continued the *Te Deum* in spite of our clearing for action. He walked along the decks with the Cross and Holy Water, and reached the upper deck when the engagement was in full swing. He paced along slowly and solemnly in his green and gold-embroidered cassock. It made a strange, indelible impression in the midst of an engagement, when the sound of the guns mingled with the voices of the choir singing the anthem: "O Lord, save thy servants." The guns were dealing out death and destruction, and amongst them went the priest who was blessing them. All heads were bared to receive the blessing of the Lord—perhaps for the last time. Only one moment each gun-layer moved aside from his sights, to kiss the Cross with which the priest had blessed him.

"A brave man, our father," the captain said *sotto voce*.

We changed our course to starboard and to port so as to follow the windings of the channel which our mine-sweepers

were clearing through the mines (they buoyed the channel as they went along.) We generally proceeded in a south-easterly direction.

At 3 p.m. we sighted a new enemy in place of the Japanese destroyers which had fled. At first the "Greyhounds" appeared, then one of the older cruisers (apparently *Matsushima*), and finally two armoured cruisers. They made no attempt to disturb our solemn procession, and thus provoked a good deal of witticism on the part of our jesters. They said the enemy had better attack us while we were "burying the cat," instead of idling about.

By 4.30 p.m. we assumed that we were in clear water. The squadron stopped, the mine-sweepers hauled in their lines (a wearisome business) and started back to Port Arthur, convoyed by the second destroyer flotilla. For the present the squadron remained stopped so as to cover their retreat. At five o'clock we began taking up battle formation. This was single line ahead. The battleships, led by the flagship, came first, then followed the cruisers led by the *Askold*.

We shaped course S. 20° E.—in other words, for Shantung.

At 6.40 the Japanese main body hove in sight on the port bow. Its course lay across ours. The Japanese were nearly complete. They had four battleships, with which the *Kasuga* and *Nishin* evidently formed one division, and four armoured cruisers. Besides this we made out the *Chin Yuen* leading three of the older cruisers, the "Greyhounds," a second squadron of protected cruisers, and the destroyers. In the divisions of the latter, which were nearest to us, we counted eighteen boats. But behind them were yet a considerable number of columns of smoke.

"They are all there; even the old *Chin Yuen* had to turn out," the officers were remarking to each other. "This is the result of the way in which we keep our secrets. During the last four days the Japanese have even been able to recall the ships off Vladivostok. Now the fun will begin."

However, I repeat we were in excellent spirits. We were looking forward to the battle bravely and cheerfully.

"There will be no turning-in to-night, old chap," the sailors joked. "To-night it will be a case of a shake-down at the gun. Mind you save up something from your supper." Laughingly they tucked away some sugar in their blue frocks and distributed the tea-kettles and tea at the guns.

"To-night soda-water and sandwiches are to be ready for the officers of the different quarters," was the mess president's order.

At 7 p.m. we went to "Action" stations.

The hostile fleet was getting nearer.

Suddenly our flagship turned to port with full helm, nearly 16 points. The other ships followed in her wake. The Japanese did not follow us, but continued their course. (Perhaps they

did not believe that we really meant to go back, and suspected some *ruse de guerre* in our movements.)

At 7.50 we lost sight of the Japanese Fleet in the dusk. Its last course had been about west.

We also at first did not believe in the intentions of our leader. But the longer we stood on, the clearer it became. The squadron was returning to Port Arthur—it was flying, although it had merely sighted the enemy. What was up? What had happened? Every one asked himself these questions, full of annoyance and astonishment.

We had no time for much guessing, for we had to act. The hostile fleet had disappeared to the westward, but his destroyers were deploying on the horizon, out of range of our guns; we had already counted thirty. They were evidently trying to draw ahead of us on both sides—obviously with the view of attacking us.

When the squadron turned, it was 23 miles from Port Arthur. It grew dark very fast: the larger part of the destroyers worked round us to the eastward, that is, our starboard side, the smaller portion on our port side. Our cruisers (*Askold, Bayan, Pallada* and *Diana*) increased speed and took station on the starboard bow of the battleships; the *Novik* and destroyers were similarly placed to port. I do not know whether we received the orders for this by flag signal, semaphore, or any other means (I did not note this). What we had to do was clear. We were to draw the torpedo attack on us and thus to cover the battleships. The weather was favourable: the night clear and calm, with the moon in its first quarter. It was not very light, but one could see well.

The attack began as soon as the after-glow had died away in the western sky. It is difficult to analyse and write down one's feelings during a torpedo attack, especially when it is one's first experience of the kind. By and by one gets accustomed to anything. My diary only says:—"For half an hour we fired like mad. Brave fellows these Japanese. They all attacked with great pluck and dash; they probably got some hits. They are gone, and we are unhurt. 9.35 p.m.—We have just anchored."

During this night's run the hostile destroyers were not the principal danger; we could head off these boats; but this time we returned without having our mine-sweepers in front, and not even by the same channel by which we had gone out by day: we might strike a mine any moment.

Gold helped us this time as well. Only the *Sebastopol* fouled and exploded a mine; happily, she was able to stop the leak and continue with her consorts.

We all anchored in the roads at Port Arthur without signal, without any orders whatever, as if by inspiration, but we somehow did it well.

The ships of the squadron were anchored in two lines. These formed a semi-circle, one end of which was near the

shore between Golden and Cross Hills, the other below White Wolf Hill.

As soon as we had anchored we got out the torpedo-nets and went to "man-and-arm ship" stations. The attacks commenced soon after.

Curiously enough, the Japanese never once attempted an attack *en masse*; each time they only sent a group of four or five boats: the same mistake as on 8th February.

Meanwhile, the powerful searchlights of the fortress formed a wall of light across the ends of our line, which nothing could pass without being seen. Every group of hostile destroyers which tried to do this came under the concentrated fire of the entire squadron; even at great distances (5 to 6 miles). The theory which prescribes the use of only the secondary and light armament against torpedo attack was completely upset. The big turret guns of the battleships fired away their expensive segment shell just as the 6-inch. How heavy this fire was, and what went on in the zone through which the Japanese destroyers had to pass, not even those who were on board could, I take it, describe. Eye-witnesses who observed this spectacle from the shore in perfect security, could not find words which were strong enough to describe what they saw.

A captain of the garrison artillery, whom I met two or three days later, was still quite excited: "It is impossible to describe it," he said; "the squadron was brightly lit up by the flashes of its own guns, but around the destroyers the bursting shell were brighter than our searchlights."

Even Japanese nerves could not stand that. In this hell seconds seemed minutes. One lost all measure of time and space. According to the fortress rangefinders, not a single destroyer got nearer than 3 miles from the squadron (that is, of course, too great a distance at which to fire a torpedo). But doubtless they were firmly convinced that they had got quite close up, and had fired their torpedoes at the usual distance of a few cables.

The attacks became especially fierce when the moon had set at about 2.10 a.m. In my diary I find: "2.30.—A hellish fire. 3.10.—The attack beaten off, the enemy gone."

The last attack took place at about 3.30 a.m.; after that the dawn put an end to the terrors of the night.

What were the Japanese losses? We don't know: they always know how to keep their secrets.[1]

Another interesting note (from my diary). "When we were firing with the guns of one side only during these torpedo attacks, the guns' crews at the disengaged side lay round their guns and snored." Were they so dead-tired, or had they in truth got accustomed to everything?

[1] Next morning we found five or six "Schwartzkopf" torpedoes in the roads. How many had sunk or drifted away with the tide?

During the engagement we never had time to reflect upon what we were doing. We had to exert our bodily and mental powers to their fullest capacity. When day dawned and the enemy disappeared we had leisure to think over our situation.

Many of us still had a faint hope that our retreat did not mean the end of our operations. It was thought that we had only placed ourselves under the protection of the shore search-lights for the night.

"That was all for the best," said our optimists. "Thanks to these powerful beams we were able to beat off the attack. The Japanese must assuredly have suffered losses in their flotillas, besides which they have burnt their coal and fired away their torpedoes. The boats will first of all have to replenish their store of both. Consequently, we may count upon one or two peaceful nights at sea."

"Quite so, if only it really were our plan," replied the sceptics. "But suppose we have simply bolted."

However, no one would concede this. In fact, those who had hinted at this were overwhelmed with reproaches. We were so anxious to believe that the "Great Edict" stood condemned, and that we were really bent on fighting it out.

On 24th June (next day), at 5 a.m., the flagship made the general signal—"Proceed into port." This shattered our last illusions.

The shadow of death seemed to lie on our ship. Only a few minutes before the officers had looked almost cheerful, notwithstanding thirty hours without rest or peace, and had kept the men in good spirits with jokes and kindly words. Now, at one blow, all life seemed to have gone out of them; their faces all became dark and dejected.

The *Pallada* relieved the *Diana* as guard-ship; she went straight to the latter's buoys and we secured to buoys in the West Basin. We made a good evolution of it, but every one worked automatically and from sheer force of habit, without the slightest "go," and that desire to outdo the other ships in smartness.

We went in to remain there. Was it not a matter of perfect indifference how it was done?

By 11 a.m. the whole movement was finished. Little was eaten at breakfast, and of talk there was still less. After breakfast every one at once went to his cabin.

"And now for a little sleep," I thought, as I threw myself on my bed.

But no sleep came. Perhaps I was overtired—perhaps there was some other cause.

My thoughts began to wander. Single words passed through my half-dreaming memory:—"We half fled—fled without fighting. Yesterday morning God helped us—last night we remained unharmed by the Grace of God—and what have we done ourselves?"

I believe that the fate of the Port Arthur Squadron was finally sealed on that day.

On shore the Japanese continued their attacks against the fortress.

On 26th June they were already as far as Lunwantung. They were supported by a destroyer flotilla, which fired into the flank of our positions from seaward. We sent out the *Novik*, *Otvajny*, *Bobr*, and the destroyers to drive the former away, and in return to bring the enemy's flank under fire.

The Japanese destroyers retired at first, but in a short time three small cruisers appeared in support. Against these we on our side sent out the *Pallada* and *Diana*. The enemy at once retired without fighting.

In the evening we re-entered the harbour.

During the night there was a brisk fire against Japanese boats. They were there evidently to drop mines. This was how they intended to prevent our ships from going out to the support of the Russian troops.

On 27th June we had a repetition of the previous day's doings.

At daylight the *Gilyak*, *Otvajny*, *Gremyashtchy*, and the destroyers went out and bombarded the enemy's entrenched positions on the heights east of Lunwantung; the *Diana* went as well in support, in case the Japanese cruisers should appear. We received orders to anchor in the roads, and to stand by to weigh at any moment in support of the destroyers. We counted fifteen wooden frames floating about. They were of the kind the Japanese used for dropping their mines overboard.

This was the result of their midnight visit. The mine-sweeping flotilla did not go out to-day. We had to clear a channel ourselves with the ships' steam-boats. We succeeded in fishing out two mines.

From early morning that day we had the outlines of hostile ships in sight on the horizon. At nine o'clock we were able to make out the *Akashi*, *Suma*, *Akitsushio*, and a flotilla of ten destroyers. Soon after eleven heavy rain set in; it was no longer possible to see further than a mile or two. We got out our torpedo-nets and stood by to repulse a torpedo attack as at night or in a fog. At 3 p.m. we received orders not to come in, but to remain out the night. Our berth was to be where Makaroff had placed the cruisers on guard behind the sunken vessels. So they had at last made up their minds to this. For two months and a half this berth, which was right in the entrance and protected the roads at least against any too bold attacks, had been kept empty.

In the evening the rain ceased, but the sky remained overcast, and after sundown it became pitch dark. The Japanese had, of course, noticed that the cruisers had not gone in, and at once tried their luck.

At 9 p.m. two Japanese destroyers crept along the shore from Liao-ti-shan. They had hoisted some of the very characteristic square sails of the Chinese junks on their masts, and had thus very successfully eluded the watchfulness of our shore searchlights. The Japanese safely got up to us, but when we turned our searchlights on them [1] we discovered their disguise. When the *Diana* opened fire on them they lowered away their sails and rushed to the attack. It was a wonderful moment when these boats, brightly lit up by our searchlights, put their helms over to fire their torpedoes. One of them came up to less than 15 cables [1½ miles]; I saw quite plainly when two of our 6-inch shell hit her: the one abaft the funnels, the other at the water-line under the bridge. This latter must have caused serious damage. We could see with our naked eyes how her bow went down and her speed dropped.

A signalman near me could not suppress his delight. "Splendid! Off he goes with his tail between his legs!"

Some on board us maintained that when the other destroyer turned off to fire, one of her torpedoes had been exploded by our shell. The boat they said had foundered. The same thing was said to have been seen from Golden Hill.

In the middle of this engagement one of the only two 6-inch guns we were able to use against the enemy ceased firing. What was up? One really hardly likes to write it down. During the loading the string with which the bag of smokeless powder flakes in the cartridge case was tied up, came undone. The flakes had fallen out of the bag and had piled up behind the base of the projectile. In consequence the cartridge case would not go home, and the breech could not be closed. The attempts to clear the powder chamber from the rear with the hand, a stick, or a hook, had failed. The gun had to be unloaded—that is, the projectile which had got jambed in the grooves of the rifling had to be pushed out from the muzzle with the cleaning rod.

"What splendid quick-firers," I said unconsciously. I really did not want to hurt the feelings of the gunnery lieutenant, who was perfectly innocent in this.

He shrugged his shoulders. "The system according to which our cartridges are loaded, their hermetically closing lid, which is only removed immediately before the cartridge is placed in the gun—all this is not my invention. Our 'Technical Committee' has elaborated and then approved all this. Am I expected to open each cartridge case and examine it before loading, when in action? In future we shall, of course, have to do this, but it will be done at the expense of rapid shooting."

The following was now to be the routine of the cruiser guard-ships:—Three times twenty-four hours in the roads, three

[1] With her own search-lights a ship can only make out a torpedo boat or destroyer at 1½ or 2 miles, according to the state of the weather.

times twenty-four hours in the entrance, three times twenty-four hours' rest in the basin. Of course the word "rest" was an elastic term. All we could claim was to have a little more rest than the others. When the cruiser division had to undertake any job the cruiser whose turn it was to "rest" sailed with the remainder.

The weather got bad. Rain and fogs were frequent. We had south-east winds. They were not very strong, but always raised a heavy swell, which interfered a great deal with the work of our mine-sweeping flotilla.

The Japanese did not come in sight for several days. But on 3rd July they attacked the *Pallada*. It was the last night of her guard (she had relieved us on 30th June). Again, on 4th July, they attacked the *Bayan*, which had relieved the *Pallada*, but in both cases unsuccessfully.

On the morning of 3rd July the destroyer *Lieutenant Burakoff* returned in safety. She had been sent to Inkau with despatches. Doubtless she had brought back orders from the Commander-in-Chief, as she had been absent four days. With her speed she could have gone there and back in one night.

I should not like to omit an incident which is connected with this episode. Perhaps it is of no importance, yet it appears to me to be quite characteristic.

The destroyer *Lieutenant Burakoff* had now run the blockade a second time, and thus enabled the besieged fortress to get into direct communication a second time with the Commander-in-Chief of our army.

In the Statutes of the Order of St. George it is quite clearly stated that whoever breaks through the enemy's lines and brings the Commander-in-Chief important news will be rewarded with the Order. Was the news which the *Lieutenant Burakoff* brought not important? Was he playing at postman for some private correspondence between two friends, which possessed no value whatever? Twice she fulfilled the conditions laid down by the Statutes of the Order of St. George. None the less her captain only received the Order of St. Vladimir at the hands of Admiral Vityeft, who, moreover, pointed out how high this reward was, which the officer should try to earn by further exertions. From the local official *Gazette* we, however, knew full well what a shower of rewards for war services descended even on persons whose participation in any operations against the enemy was more than doubtful.

On 3rd, 4th, and 5th July, the *Novik*, gun-boats, and destroyers, headed by the mine-sweeping flotilla, went out daily and bombarded the coast between Lunwantung and Sikou Bay. All the cruisers were kept under steam at a moment's notice, in case Japanese cruisers showed any intention of interfering with our vessels. Our services were not required once. The hostile fleet, for some reason or other, did not consider it necessary to make even an attempt at chasing away our few ships. Meanwhile, these same ships caused the enemy's army

heavy losses and contributed largely toward forcing them to retire, if only for a short time.

When the *Novik*, gun-boats, and destroyers returned on the evening of 5th July, they were received by the coast batteries with bands and cheers.

Three days of rainy weather now made all active operations impossible. Then we once more bestirred ourselves. On 8th July a new attack by the gun-boats and destroyers against the Japanese left flank took place. The *Askold* was guard-ship outside, but the *Diana* was also sent out to meet any eventuality.

On the horizon, about 10 miles off, we could dimly see the outlines of three ships, apparently the *Matsushima*, *Itsukushima*, and *Hashidate*. They attempted nothing against our boats. But towards 3 p.m. a division of Japanese destroyers approached. They retired after a short artillery duel, when the gun-boats began to fire on them. Meanwhile, the steamer *Bogatyr* laid out mines in Taché Bay. The *Bogatyr* had been converted into a mine-layer. The *Amur* was still in dock repairing her under-water damage.

We of the *Diana* viewed these doings of the *Bogatyr* with some suspicion. "If Taché Bay is being blocked up with mines, it means that the retreat from Lunwantung heights is being prepared, also the retreat from Green Hill and the Wolf Hills. Bad business. The investment of the fortress is complete." This was whispered about amongst the officers.

On 9th July a "big operation" was begun. The *Novik*, the destroyers, all first-class cruisers, and even the *Poltava* went out. At 9.30 this solemn procession, headed by the mine-sweeping flotilla, set off towards Lunwantung. Some large ships were in sight on the horizon, but so far off that we could hardly make them out. Several divisions of hostile destroyers were somewhat nearer. These latter once attempted to attack the mine-sweeping flotilla, but when the cruisers opened fire on them, they retreated hastily, and disappeared. When we had reached our destination, the *Poltava* anchored in the eastern portion of Taché Bay. The cruisers went on as far as Lunwantung, but no further, for here both the Japanese and we had been laying out mines at night with equal energy. The destroyers went ahead nearly up to Sikou. Towards 2 p.m. we began to shell the flank of the Japanese position. Our fire was improved by Morse signals from the shore, which told us where our shell were pitching.

The enemy became restless. His ships, which had been in sight a long time, now approached us up to 55 cables (11,000 yards) and opened fire on us at that long range. They were the *Matsushima*, *Itsukushima*, *Hashidate*, a division of gun-boats, and some destroyers.

They did not dare come any nearer. It afterwards turned out that the *Bayan* had, by a lucky shot, hit one of the Japanese cruisers in the stern with one of her 8-inch guns. We must, I feel sure, have scored other hits as well. At least the Japanese

retreated very rapidly to a distance of 7 to 8 miles. The *Bogatyr* again dropped mines in Taché Bay.

We could not help suspecting that the entire "big operation" was only intended to cover this latter enterprise.

That was a bad sign. But there were others which were worse. The arsenal of the fortress commenced serving out small arms for the entire ships' companies,[1] and every soul on board, including even stokers and the "daymen," were drilled as small-arm men and put through a course of musketry at the butts. Up to now the landing parties were ordered to be only of such strength that, without them, the ship could still develop her full engine power and man the guns of one side. Consequently we had kept the whole of the engine-room *personnel*, the specialists of all branches, and half the seamen on board. The Port Arthur Squadron was evidently to prepare for a long and close siege together with the garrison of the fortress. The following rules were now established:—On the signal being made to land small-arm companies, the whole crew, except the above-mentioned specialists, and half the officers were sent. The further signal to land the "Reserve Companies" meant all the remainder. We were only to retain on board the senior specialists amongst the officers and petty officers. In our case these amounted to forty all told, and these were so far as possible to work the guns in case of need. At critical moments they were to destroy the ship to prevent her from falling into the hands of the victorious enemy—a sad prospect.

[1] According to rule, only the seamen and a few petty officers of the crew were armed with small arms. The specialists, that is, gun-layers, electricians, torpedomen, signalmen, and helmsmen, were only armed with revolvers. The engine-room *personnel* possessed no arms at all.

(To be continued.)

THE WAR IN THE PENINSULA, 1808-14.

Valuable Notes from Recently Discovered Diaries of the War, now being Published in "El Imparcial," of Madrid.

Précis by Major-General J. C. DALTON, R.A.

Continued from September Journal, p. 1208, and concluded.

VI.

Seville During the Battle—An Anonymous Patriot—The Sacrifices of Sacked Cordova—Popular Anxiety—Letter from a Field Officer—Giron Undertakes the Official Part—Modesty of Castaños.

It is not proposed to weary readers of these articles with a fresh description of the battle of Bailen, which is already well known in detail,[1] nor is there in the manuscripts under review, practically, anything referring to the actual battle. Giron had not the luck to take part in it, and the truthful narrator respects "the interiority (sic) of a feat of arms which can only be worthily depicted by the pen of the man who thereat wielded the sword."

It will be interesting now to revert to the President of the Junta, Saavedra, who was anxiously awaiting in Seville for news of the battle. The usual crop of unreliable rumours was coming in, which only served to excite and exasperate the popular mind.

A patriot, whose name and abode are not given, wrote to the President on 16th June, 1808, an account of his journey from Madrid with Vedel, "because his loyalty to his country forbids him to be silent regarding certain interesting information," then refers to the numbers of the enemy, to supposed dissensions between Vedel and Dupont, as well as to the circumspect nature of the former; *e.g.*, "if he (Vedel) should be threatened in his rear he will not advance, and as he will thus delay more and more the junction (with Dupont), it will be possible to beat the French columns separately." This news, notwithstanding its vagueness, was sent post haste to Castaños.

[1] There are excellent official maps published in Spain to illustrate this battle, with positions of the troops at various periods. Oman, in his "Peninsular War," has also got good maps showing the progress of the fighting.—J.C.D.

On the 17th July, news, mostly untrue, began to filter in from the villages in the theatre of operations, and kept the people agog. Saavedra, writing at this time, says: "He who is an observer of the human species will note in this general uneasiness that kind of agitation which involuntarily gives rise in people's minds to an expectation of decisive events."

The population could not get themselves to think of any business; the war absorbed them, and it was the universal topic of conversation. On the morning of the 18th, news arrived that Castaños had taken the fortified position of Los Visos, but not the high road where the enemy was established in force; it described the intolerable heat and thirst which had accounted for many lives, soldiers having thrown themselves in despair into the river which the French were defending with the utmost vigour.

In the evening news came of Reding's great success at Menjibar; the battle had been "obstinate and glorious." The enemy, whose best troops were there, had lost General Gobert, guns and colours. "Amongst other feats of gallantry Reding's and Ordene's regiments, and the Spanish and Walloon Guards, had formed a famous square, which repulsed repeated attacks by 800 French Cuirassiers, supported by clouds of skirmishers and by a regiment of *Chasseurs à cheval*, in all 1,400 horsemen, who were all but annihilated."

"This news, spread by the people, caused extraordinary excitement, and everyone was now sure of victory; but those who knew the real state of affairs, though they heard of these fine beginnings, were cautious as regarded their expectations of ultimate success. Vigilance was redoubled in all exposed parts, but the public rejoicing degenerated into disorder. All day and part of the night the streets were thronged with people cheering and singing, but it was from pure joy. Patriotic songs multiplied, and were the favourite airs of the day. The names of the members of the Junta, of Castaños, Reding and Ferdinand VII. resounded on all sides."

Letters kept arriving which repeated the advantages gained by the Spaniards with natural exaggeration. The letter which made most impression on the Junta was one from the Governor of Cordova, Field-Marshal D. Antonio Gregorio, stating that when the Commissary of the Army made known the need of funds, all unanimously responded, and notwithstanding the ruin and pillage which they had endured, they made up a sum of a million reals (£10,000) for—as they put it—"the relief of the heroes who were going to save their country."

That evening, the 18th, the President had a letter from Castaños saying that the plan of campaign made at Utrera was about to be realised, that Dupont was surrounded, and that Vedel, who had arrived at Bailen the day before, had been forced to retire, being threatened in rear by Mourgeon and Valdecanas. He added that Dupont might attempt to escape by

the Sierra, that he had just intercepted a letter from that General to Beliard relating the straits in which he found himself, but that he was resolved to defend the bridge of Andujar "to the last."

"Under these circumstances," said Castaños, "I expect to-morrow to make a decisive attack in conjunction with Reding and the other troops of the vanguard, trusting in the help of the God of Armies and the intercession of the protecting saints of the Spanish Army, Santiago and San Fernando."

The 20th July was an anxious one for the Junta and for the people. "At half-past five in the afternoon," writes Castaños, "a *Parlementaire* arrived asking for suspension of hostilities to enable General Dupont to confer with General Reding. I have refused it. A few minutes since I received a letter from General Pena stating that the French wanted to surrender; I would concede nothing less than that they should be prisoners of war, promising the General and his officers to retain their swords and one portmanteau of clothes, bearing in mind the pillage they had carried out in our cities, assuring them, however, that they would be treated with the consideration which the French squadron received in Cadiz in accordance with Spanish generosity. Whilst I am preparing details, Your Highness will know that we have taken guns, made prisoners, and in a word that General Dupont is surrounded. Army Headquarters, Andujar, 19th July, 6 p.m."

The messenger was sent off to rest, and told to keep the news private.

The President summoned the Junta, and though it was recognised that the surrender of the French was not as yet a *fait accompli*, it was decided to print and circulate the General's letter. By 6 a.m. on the 21st all knew the contents. "Though there were no salutes, the joy was so boisterous and expressive that no one could doubt that a great triumph was already assured."

To avoid misapprehension and undeceive the people, who imagined that the French were in the inferiority as regards numbers, the President made known the contents of Dupont's letter to Beliard, which he had kept to himself up to that time, proving that as the French had 24,000 men, including 3,500 cavalry, the army had fought with equal numbers, though the French had the superiority in cavalry, and twenty years of war behind them.

The people meanwhile awaited details of the capitulation with intense eagerness.

At 10 p.m. a cavalry soldier who had been present at the battle arrived bringing letters from some officers, more particularly one written by a field officer, and which the recipient hastened to communicate to the Junta.

This related that "Reding, having again joined hands with the vanguard under Venegas and the division of Coupigné had left Bailen at 2 a.m. in order to arrive at the point of atack at the hour agreed on. When it was barely possible to distinguish

objects they ran straight into the advanced troops of Dupont. Our troops knew the ground well; they recognised that they were advantageously placed, halted, deployed for action, placed their batteries quickly in position and took up firm ground. Dupont attacked in three columns, but was vigorously repulsed; he repeated five attacks of the same kind, but with no better luck. At last he himself with his generals led a last and desperate attempt in four columns. Our troops remained immovable, reserving their fire, and awaited the attack in silence and serenity almost at pistol shot. Then our artillery and battalions opened on the enemy a *feu d'enfer* which dismounted their guns, covered the field with dead, and forced the French to beat a hasty retreat. It was 10 a.m., and we began to hear distant firing. This was the division of General Pena which was arriving and was falling on the enemy's rear. The confusion and disorder of the French cannot be described. Dupont, defeated in front, attacked in rear, unable either to advance, retire, or escape, without food and almost without water, asked for a suspension of hostilities, and capitulated—forced to submit to such conditions as might be imposed on him."

The Members of the Junta were now set at ease in their minds, and "retired to rest under the laurels which their General and his army had secured."

The laborious capitulation having been arranged and terminated, Giron, commissioned by Castaños and Tilly, to carry the news to Seville, started on the 21st July.

"I left Andujar post haste at 11.30 a.m. I entered Seville at 4.30 p.m. on the 22nd. What happiness amongst the inhabitants! What craziness of joy! I was given the rank of Brigadier with letters of service; I renounced the £240 to which I was entitled by the latter. They wanted in the first moments of their joy to make me a Field-Marshal. I thought it my duty to decline that."

The General, says Saavedra, after explaining everything in his despatch in the most modest manner, attributing his success to the assistance and dispositions of the Junta, begged that a solemn festival of thanksgiving to Saint Ferdinand might be arranged in accordance with his promise before going into action.

The Junta ordered three nights of illuminations. On the morning of the 23rd the Members repaired, preceded by a guard of honour and accompanied by all the Corps in Seville, to a solemn Te Deum, which was chanted in procession through the naves of the Cathedral, concluding with prayers in the Chapel Royal, where the body of the sanctified monarch was exhibited.

This was a fitting culmination of the happy intoxication wherein the joy of the shipwrecked on touching *terra firmâ* is mingled with pride at an almost incredible triumph!

To the courageous generation which traced with its blood in the history of the world the glowing name of BAILEN may with justice be ascribed the honour and prestige which have

been the safeguard of Spain against serious invasion for well nigh a century.

VII.

After the Battle—Offensive Insinuations—The Surrender—Plans and Delays—The Action by the Junta—Final Summary.

The details of the capitulation of Dupont's Army are public property. It would be hard to find a precedent for a surrender such as this, an entire division (Vedel's) giving up its arms without any fight. There is nothing essential that is not known of the affair. The negotiators of the terms added greatly to the advantages obtained by the victors, though certain ignorant and untruthful historians have not hesitated to attribute the fruits of clever diplomacy to sinister threats of cruelty. In an interpellation addressed by Brigadier Macdonal (sic) to Brigadier Giron, there occurs this question:—

"By what means did Castaños produce such fear, that Vedel, being still very far away, had to surrender?"

To this insinuated suspicion of cruel and intimidating threats Giron replied with dignity:—

"General Castaños did nothing to produce fear. The rout suffered by Dupont, and the desperate situation in which he found himself after the battle, was bound by itself to produce fear, and did produce it, and the desire to ameliorate the conditions of the capitulation for his troops caused him, without doubt, to include the troops of General Vedel with his own, in which matter General Castaños negotiated with great cleverness. The situation of Vedel was, moreover, very critical. Being 50 leagues removed from any hope of succour, in the midst of a hostile and determined people, and with a victorious enemy in superior numbers in front of him, capable of pursuing and overtaking him without difficulty, he could not flatter himself into the smallest hopes. General Castaños understood how to profit by all these circumstances, and by the passions of those with whom he was treating, and he completed by good diplomacy in the terms of surrender what he had gained by arms on the battlefield."

A proof that the aim of the French was to extend the concessions of the capitulation to the greatest possible number of their troops is to be found in the fact "that General Marescot begged as a favour that the Commander-in-Chief should include on the same footing as the troops of Vedel, the garrison of Manzanares, which came from the centre of La Mancha, no great distance from Madrid, to lay down its arms in Andalusia, so great was the influence of the decisive victory in their minds."

On 24th July, Castaños informed the Junta that Dupont with his division, had filed past through the midst of the Spanish Army, formed up on the battlefield, handing over eagles, standards, artillery, arms, ammunition wagons, and baggage,

"the grandest and most flattering spectacle which could offer itself to the eyes of Spaniards."

Giron, in his description, says:—"Eight thousand, two hundred and forty-two splendid French troops, marching with the martial step peculiar to that army and with the pride of its past triumphs, came to lay down its arms at the feet of a Spanish Army formed in 20 days."

"Our soldiers did not belie their characters under these circumstances; satisfied, but not overcome, with their triumph, they knew how to preserve the dignity of the national character and to respect in their enemy, who had already surrendered, the valour and misfortunes of the conquerors of Europe."

So complete had the victory been that it was necessary to authorise the aide-de-camp, Villoutrey, to bear to Madrid the news of what had occurred, "such an event being unknown to Europe since the celebrated victory of Bitonto."[1]

Some disorder occurred in the distribution of the spoil owing to the presence of a large number of inhabitants, some from a long distance, "who appropriated a good deal of it, a proceeding which was tolerated by the very troops who themselves had principally suffered; but great success and overflowing hearts made them generous."

The feeding of 24,000 prisoners[2] was a serious matter: some were sent to work in the fields with the inhabitants, others were put on to public works; they were registered without any force, "leaving them such property as appeared to be their own or belonging to their corps; but all works of art and valuables, especially sacred vessels, which were found in their possession, were returned to the churches or other owners to whom they belonged."

Saavedra relates how a disturbance occurred in the Port of Santa Maria, because when Dupont was embarking "the trunk belonging to one of his officers broke open and a chalice fell out of it." The popular indignation at the sight of this was only appeased by the firmness of the Governor and by the exertions of the regiment of Ecija.

On 1st August Castaños entered Seville amidst the greatest enthusiasm. "His first act was to go to the cathedral to thank the Almighty and his protector, San Fernando, and to deposit in the chapel dedicated to the latter the trophies captured from the enemy. He then visited the Junta, which acclaimed him Captain-General of the Army and one of the Junta's most worthy members."

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[1] At the battle of Bitonto, which is near the Gulf of Bari, in Italy, the Imperialists were signally defeated by the Spanish under the Duke of Montemar, General to Don Carlos, on 27th May, 1734. Don Carlos was crowned King of Naples, the German Viceroy was expelled, and the Duke of Montemar created Duke of Bitonto. This affair led to the subjugation of Sicily, which soon followed.—J.C.D.

[2] Included in this number are those who surrendered with the French squadron in Cadiz.

And now we have to note the serious inconvenience which must inevitably result from the Constitution of the Juntas, especially as regards the course of future operations.

Castaños was obliged, in order to reap the fruits of the battle, to march rapidly on Madrid.

Some thought that there being a French army in Portugal and 24,000 prisoners in Andalusia, the former could not desert the latter, and it was considered advisable that Castaños, having effected a junction with the force in Extremadura, which amounted, it was said, to 20,000 men, together with 10,000 Portuguese, should fall on Lisbon, and, after securing the surrender of Junot, should march to the French frontier to cut off the retreat of the enemy. However, news arrived that England had taken on herself the task of driving Junot from Portugal, and it was then decided that the army should march direct on Madrid.

The Spanish force was unprovided with the indispensable means for operating at such a distance, and thereby difficulty was experienced in supplying it and getting it started.

On 15th August the General-in-Chief left for Madrid, accompanied by the representative of the Junta, D. Andres Miñano, and arrived in Madrid on the 24th.

The Central Junta having been established in Aranjuez on 24th September, the Junta of Seville then became reduced to a dependent and subordinate body.

The worthy President of the Junta of Seville thus alludes to the subject:—

"The Junta of Seville did what it could during its period of power to carry out the great object which it had at heart; but it had the defects inseparable from a numerous body especially under such difficult circumstances. Twenty-four persons of different and even of opposite characters, each of whom believes himself to be invested with supreme authority, and who sees the population submitting to his orders, are not easily reduced to that unity which is the first requisite for a well-regulated government.

"There were in the Junta strong and bitter discords; there was also the spirit of vanity, which poisons the most well-deserving bodies. This was especially noticeable after the battle of Bailen. Many individuals, who had shown great austerity in troublous times, had not sufficient strength of character to resist the seduction of prosperity. They wanted superior treatment, greater lustre, and higher honours than they were entitled to.

"Notwithstanding these minor defects, the Junta did good service. The hands of the members never touched a farthing of public money. The total amount disbursed during those memorable four months barely amounted to £210,000. With this the Junta created, maintained, and sent into action a fine army of about 30,000 men; it maintained 20,000 prisoners for two months, and religiously fulfilled all the obligations of the State.

"There were no extraordinary imposts levied, and no debt incurred beyond a loan in Gibraltar amounting to under £20,000, and punctually paid, really before it was due."

. . The whole course of action was dictated by sagacity and prudence, and by consideration for the Commander-in-Chief, whom they left untrammelled and free to act as he thought best.

The regular forces gained much glory in this successful campaign, and the revolution increased rather than diminished their discipline and patriotism.

The measures adopted by Castaños to keep in hand the heterogeneous team entrusted to him were wise and clever. He guided his recruits gently at first and introduced them to the seriousness of war by gradual steps; from manœuvres to engagements at long ranges, thence to the skirmishes of Los Visos and the harder fighting at Menjibar and Villanueva. This explains the admirable firmness they displayed at the supreme moment, which caused Thiers to allude to them as "walls of bronze."

The striking figure of Castaños emerged from this battle still grander and more noble; careful and prudent in his undertakings, conciliatory in council, clever and foreseeing in initiative, modest in victory, persuasive and affable in negotiations, he possessed the hand of iron in a velvet glove, and knew how to guide multitudes with a subtle and imperceptible power of command.

He was fortunate; that portion, by no means small, which in war is due to chance, was decided in his favour; but no one could deny that all which in war rests on calculation was in his case attended to with certainty and notable resolution.

But the real hero of that epoch is the population of Seville. On assuming the mantle of authority, which dropped at the time of the revolution, it hastened to place it on the shoulders of those who so completely justified their selection. The patriotism of the people was admirable.

The Sevillanos showed that when souls are exalted to a dangerous height the people are invincible, if enthusiasm, instead of overflowing into garrulousness, or ferocious revenge, will but subside into voluntary obedience, by which a vociferating mob is transformed into a conquering host.

Giron thus deals with the subject of the fruits of this decisive battle. "He who may desire to ascribe to the battle its full value, and to judge how far the victory of Bailen influenced the fate of Spain and of Europe, should for a moment imagine it to have been lost, the French victorious on the shores of the Guadalquivir, spreading all over Andalusia, breaking up the Government in Seville, and assaulting the walls of Cadiz, which city later on became the refuge of the entire nation; the usurping King meanwhile remaining tranquilly in the capital of the kingdom; his party freed from vicissitudes and risks being daily augmented by timid and lukewarm Spaniards; the

prestige which preceded and invested the French eagles, fortified by a new victory actually seen, not merely reported; the first attempt of a people which dared to resist the yoke which others had submitted to in a miserable and torturing silence. . . . . Such and still worse would have been the consequences of a disaster at that juncture had the state of affairs been as above described; imagination can, with difficulty, conceive it all; the country, now free, shudders at the bare idea of it."

"And what were the results of this victory? What carried the French, the undisturbed occupants of the capital of the Spanish Empire, beyond the Ebro? What gave the Spaniards breathing time? What enabled them to form a central government, and start the pernicious, though at that moment indispensable, federation of the Provinces? What induced the partisans of King Joseph to hesitate, and brought over to our side all those who did not fear the vengeance of the indignant people? What led to the French Army being isolated in Portugal, and to the subsequent victory of Vimiero and Convention of Cintra, which freed that kingdom and gave it the necessary time to organise its ulterior defence? What exalted the soul of the English nation and made our cause popular in that powerful State? What gave to the rest of the world the example of a great triumph gained by raw troops over the conquerors of Prussia, Austria and Russia? What made them conceive the possibilities of the future Leipsic and Waterloo, where was completed so gloriously that which was commenced at Bailen?

"If Europe some day were to erect a monument to bring to the mind of generations to come its glorious emancipation from the colossal Power which, arising out of an unheard-of revolution dominated her for a considerable time, Spaniards would read with pride on the base of this monument the memorable name of BAILEN, and history, uninfluenced by passion, would inscribe in letters of gold the pages wherein they present to future generations that portentous battle which led to those immortal victories on the fields of Saxony and Flanders, and restored to disturbed Europe its independence and repose!"

THE JAPANESE ARMY IN 1908.

(Translated by permission of the Minister of War from the *Revue Militaire des Armées Etrangères*.)

Continued from September JOURNAL, p. 1219.

CHAPTER II.

ORGANISATION OF THE JAPANESE ARMY IN TIME OF PEACE.—TROOPS AND EFFECTIVE STRENGTH.

Composition of the Army.—The organisation of the Army, both in peace and war, is based on the division, which, as the unit of the higher organisation, may be regarded as intermediate between the French division and the French Corps d'armée. The Japanese Army has no army corps.

There are 19 divisions, viz., eighteen, numbered from 1 to 18, and the Guard Division.

Previous to the war there were only 12 divisions and the Guard. Four divisions, the 13th, 14th, 15th, and 16th, were formed while the war was in progress. When peace was made these four were retained provisionally in Manchuria and Corea. In March, 1907, the 15th and 16th Divisions were withdrawn to Japan and temporarily quartered in the huge barracks previously occupied by the Russian prisoners. In October, 1907, the 14th Division was replaced in Manchuria by the 10th Division and returned to Japan. The 13th Division remained in Corea, but it is probable that it will be relieved in the course of the present year (1908) by the 2nd Division.

The cost of a division in Manchuria or Corea is about double that of a division at home in Japan. Consequently the recall of two divisions without relief enabled the Japanese Government to create two new divisions, the 17th and 18th, which raises the total number to 19.

In addition to the 19 divisions, the Japanese Army contains the following troops:—

Two independent brigades of cavalry, each of two regiments of four squadrons.

Three independent brigades of field artillery, each of two regiments of six batteries.

Three independent battalions of mountain artillery, each of three batteries. These battalions would be attached on mobilisation to the troops operating in mountainous regions.

Certain units of "heavy artillery" replacing the former units of "fortress artillery," and comprising:—

Two brigades of heavy artillery of two regiments each. These brigades man the guns of the coast and other permanent fortifications in Japan. They also furnish on mobilisation the units of heavy artillery required by the Army in the field.

Two independent regiments of heavy artillery (the 3rd and 4th). They will form the siege trains.

Twelve independent battalions of heavy artillery, six in Japan itself and six quartered outside Japan (two in Corea, two in Formosa, one each in the island of Tsu-shima and at Port Arthur).

In time of peace, regiments of heavy artillery have each three battalions of three companies; the independent battalions have a variable number of companies.

Lastly, there is a brigade of "communication troops," comprising a railway regiment of three battalions of four companies, and a telegraph battalion, consisting of four telegraph companies, a wireless telegraph company, a balloon company, and a search-light instructional section.

Troops Stationed outside Japan.

Garrison of Corea. — The garrison of Corea consists at present of the 13th Division, recently reinforced, on account of the events which took place at Séoul last summer, by the 12th Brigade (12th Division), and four squadrons of cavalry. There is also a battalion of heavy artillery, two companies at Port Lazareff, one at Masampo, garrison of Manchuria, and the Kwan-tung Peninsula.

This is at present made up of the 10th Division (headquarters at Liao-yang), a battalion of heavy artillery at Port Arthur, and six battalions of railway guards along the railway line. The latter have each 4 companies and a strength of about 754 of all ranks (total 4,524).

It appears to be the intention of the Japanese to augment the railway guards to a strength of about 9,420, distributing them at the same time into fifteen detachments, each of about 628 of all ranks. This will enable the whole of the line troops to be concentrated in the Kwan-tung Peninsula, and it will then be possible to reduce the garrison. It is probable that later on the divisions in Manchuria and Corea will be withdrawn, and that the garrisons will be furnished by independent bodies of troops, specially recruited, like the Formosa Division.[1]

[1] This is practically certain. Under the modern military system, permanent over-sea garrisons are furnished by special troops (sometimes by a special Army), quite apart from the National or Home Army. The conditions of service of such troops can thus be adapted to their employment, and long service can be resorted to when circumstances make this economical or convenient.

Brigade of Occupation in Pechilli.—This is a mixed force, comprising two regiments of infantry, a squadron of cavalry, a mountain battery, and a (telegraph) detachment of engineers. The troops are drawn from the Army and relieved periodically.

The garrison of Formosa consists of two mixed brigades, each of three battalions of infantry and a mountain battery. There are also two battalions of heavy artillery (Kulung and the Pescadores), each of two companies. These units all receive their recruits direct from Japan, and have no connection with any division.

Tsu-shima Militia.—One battalion of infantry, a mountain battery, a squadron, and a battalion of fortress artillery. All the men of the island of Tsu-shima who are physically fit perform a year's service in these troops.

Garrison of the Island of Saghalien.—A battalion of four companies, to which each of the four regiments of the 7th Division ("Hokkaido") contributes a company; a troop of cavalry, furnished by the 8th Regiment (8th Division); a section of mountain guns; and a telegraph detachment.

Composition of a Japanese Division.—The normal composition of a division in time of peace is two brigades of infantry, each of two regiments of three battalions of four companies; a regiment of cavalry of three squadrons; a regiment of field artillery of two groups, each of three batteries. (The batteries have six guns, six ammunition wagons, and one battery wagon, all drawn by six horses.) Also a battalion of engineers of three companies and a transport battalion of three companies.

The Number of Units in the Active Army in Peace Time, and their Establishments.

The total number of infantry battalions, including the Tsu-shima battalion, is now 229. Before the war it was 157.

The cavalry musters 73 squadrons, as against 55 before the war.

With regard to the artillery, the artillery attached to divisions now consists exclusively of field batteries. There are altogether 150 field batteries, instead of the 75 which existed before the war. The mountain artillery has been reduced from 39 batteries to 9 only.

The engineers have altogether 54 companies, against 39 before the war.

The transport train has 19 battalions.

There is also the Gendarmerie, amounting to about 4,000 men.

The total strength of the Army in time of peace is between 210,000 and 220,000.

NORMAL ESTABLISHMENTS OF THE UNITS OF THE DIFFERENT ARMS IN TIME OF PEACE.

—	Officers.	Non-commissioned Officers.	Superior Soldiers (gefreite).	Privates 1st Class.	Privates 2nd Class.	Totals.	Horses.
Company of Infantry ...	5	12	18	42	79	156	0
Squadron of Cavalry ...	5	12	14	37	72	140	135
Battery of Fd. Artillery	5	10	10	31	72	128	62
Mountain Battery ...	5	10	10	30	72	127	37
Company of Engineers	5	14	22	43	86	170	5
Company of Railway Engineers ...	5	12	14	30	64	127	5
Telegraph Company ...	7	15	14	32	64	132	7
Company of Transport Train ...	7	18	18	25	291	359	150
Company of Heavy Artillery ...	5	10	10	30	70	125	3

—	Officers and Men.	Horses.
Regiment of Infantry (3 Battalions)	1,950	14
Regiment of Cavalry (3 Squadrons)	462	454
Regiment of Field Artillery (6 Batteries) ...	807	382
Regiment of Mountain Artillery (6 Batteries) ...	807	244
Battalion of Engineers (3 Companies)	544	19
Battalion of Transport Train (3 Companies) ...	1,114	457

ESTABLISHMENT OF A DIVISION IN TIME OF PEACE.

Officers	397
Non-commissioned Officers ...	1,059
Soldiers	9,546
	11,002 men and 1,304 horses.

Command of the Army.

The Emperor is the supreme head of the Army, both in peace and war. In peace time he is assisted by a Supreme Council of Defence, which is intended to ensure complete unity of action between the Ministries of War and Marine. The Supreme Council consists of the Marshals, the Admirals of the Fleet, the Ministers of War and Marine, the Military and Naval Chiefs of the Staff, the Inspector-General of Military Instruction, and some Generals and Admirals specially nominated by the Emperor. Since it was created in 1893 the Council has met twice, once in March, 1901, and again in January, 1904, on the eve of the war.

The actual administrative and executive authorities are the Ministries of War and Marine, the General Staff of the Army (four departments), the General Staff of the Navy, and the De-

partment of Military Instruction. The Chief of the General Staff is independent of the War Minister, and is responsible only to the Emperor.

Up to 1907 the divisions of the Army in Japan were grouped in peace time into three great commands, each containing four divisions. (The Guard Division takes its orders directly from the Emperor.) These commands were those of the East (Tokyo), of the Centre (Osaka), and of the West (Hiroshima). It is not yet known how the more numerous divisions of the new organisation will be grouped. It is as well to remark here that these great commands have no connection whatever with the separate Armies which are formed in time of war.

The government of Formosa and the Pescadores is a post held by a General or an Admiral, who is assisted by a military and a civil staff.

The Supply of Officers and the Military Schools.

In time of peace, officers are appointed solely from the pupils of the School of War at Tokyo. In war time non-commissioned officers may become officers, but they do not, as a rule, rise beyond the rank of captain. Speaking generally, the recruitment of officers in time of peace closely resembles the method followed in Germany. All officers must pass through the War School. Young men are admitted to this institution after an examination. They come from two different sources :—

1. The Cadet Schools.
2. One-year volunteers who are candidates for commissioned rank.

There are six Cadet Schools. Boys enter at the age of 13 or 14 and remain for three years. The future officers then pass two years at the Central Military School of Tokyo. During this period they are attached to a regiment for six months. At the close of the course they can be admitted to the War School.

The candidates among the one-year volunteers are young men who have obtained certain diplomas or who have passed a special examination, and who, after having obtained the consent of the officer commanding the regiment in which they wish to serve, engage as "one-year volunteers, candidate officers."

Candidate officers enjoy certain privileges in their regiments, and in the course of their year of service they are promoted to the rank of sergeant. Afterwards they can be admitted to the War School like the young men coming from the Cadet Schools.

The course at the War School lasts one year, commencing always on 1st December. At the termination of the course the young men receive certificates and are posted to regiments as *aspirants*. It is not till about six months later that they become second lieutenants, after acceptance by the body of officers of the regiment.

In 1904, 500 young men were admitted to the War School at Tokyo.

Promotion.—Promotion is partly by seniority and partly by selection. Selection is chiefly exercised in the case of officers who have passed the Academy of War (or Staff College).

Reserve Officers.—These are obtained as in Germany from officers of the Active Army who have resigned, and from one-year volunteers who have passed a qualifying examination. Reserve officers are obliged to attend a course of instruction lasting five weeks every second year.

The number of Reserve officers in 1907 appears to have been: 34 lieut.-generals, 40 major-generals, 2 paymaster-generals, 9 inspecting paymasters, 10 surgeon-generals, 103 colonels, 210 lieut.-colonels and majors, 2,117 captains and subalterns.

Non-commissioned Officers are obtained: (1) from candidate non-commissioned officers, *i.e.*, young men who, on entering the ranks announce their intention of re-engaging; (2) from the "superior soldiers," analogous to the German "gefreite."

Re-engaged non-commissioned officers receive higher pay and a re-engagement bounty. The amount of the latter depends on the period of re-engagement. After ten years' service they obtain a medal and a further special bounty.

Schools Intended for the Higher Military Education of Officers.

The first of these is the Military Staff School, or War Academy. This institution is intended to extend and perfect the military knowledge of the rising generation of officers, and to fit them both for the duties of the General Staff proper and for those of the "adjutantur." The duration of the course is three years, during which the officers are attached in turn to all arms other than their own during manœuvres. On leaving the College the officers who have done best go to the General Staff proper, the others to the "Adjutantur."

Artillery and Engineers' School.—A school for the special instruction of the young officers of these arms.

Field Artillery Practice School.—This establishment receives captains and lieutenants from regiments, or on leaving the Artillery and Engineers' Schools. They go through courses of three months and two months respectively. The instruction is essentially of a practical nature.

Heavy Artillery Practice School.—A school similar to the above for officers of the heavy artillery.

Cavalry School.—This school has two branches: one for the tactical instruction of captains and lieutenants, and sometimes 2nd lieutenants, of cavalry; the other is a school of equitation for junior officers, and sometimes sergeants, of cavalry, field artillery, and the transport train. The course lasts eleven months.

Military College of Toyama.—This is a sort of advanced school, intermediate between the War School and the Military Staff School. It has three branches: a tactical and fields works branch, a musketry branch, and one for gymnastics and fencing. The officers attending it receive special training in these subjects, and also gain some experience in artillery and small-arm practice. The duration of the courses varies in each branch.

Schools for Non-combatants.—These are:—

The School of Military Administration.
The School of Military Sanitation (Medical School).
The Veterinary School.
The Pyrotechnic School (Ordnance Laboratory School?).
The School of Military Topography.

Remounts.—The horse of Japan is in general an indifferent animal, and the number of men accustomed to deal with horses is comparatively small. The remount question is therefore a difficult one, and the Japanese Army has hitherto been obliged to depend largely on foreign importations (15,000 horses were bought in America in the course of the late war). The north of Japan has the most and also the best horses. The Government is making every effort to improve the horses in the country and to encourage breeding. A horse-breeding and remount department was formed in 1906, and placed immediately under the President of the Council. There are now eleven horse-breeding establishments and three young horse depôts under this department. In 1906 a Commission sent to Europe purchased 54 stallions.

There are also several remount depôts under the Minister of War.

(To be continued.)

NAVAL NOTES.

Home. The following are the principal appointments which have been made:—Captains—S. E. Erskine to "Venerable"; H. Chatterton to "Andromache"; C. Maclachlan to "Hibernia."

The second-class cruisers *Flora* and *Cambrian* were recommissioned on the 7th ult. at Colombo for a further term of service on the China and Australian Stations respectively.

Launches.—The new first-class battleship *Neptune*, one of the improved *Dreadnought* class, was launched on the 30th ult. at Portsmouth, the naming and launching ceremony being performed by H.R.H. the Duchess of Albany. The dimensions of the ship are understood to be as follows:—Length, 510 feet between perpendiculars, 560 feet over all; beam, 85 feet, and displacement, 20,250 tons. She will be fitted with turbine engines, to develop 25,000-I.H.P., giving a speed of 21 knots. Her armament will consist of ten 50-calibre 12-inch guns of the latest pattern, disposed in five turrets, three of which will be on the central line, and one on each side of the ship, these latter being placed *en échelon*. She will thus be able to fire the whole of the ten guns on either broadside, whereas her predecessors could only fire eight; in addition, the middle turret on the centre line will be raised and placed close forward of the after one, so that its guns can fire over it, a stern fire of eight guns, instead of six only, will be thus obtained. The secondary armament will, it is believed, be the same as that of the *St. Vincent*, viz., twenty 4-inch guns, but in some quarters it is stated that she will carry 6-inch guns; there will also be three submerged torpedo tubes.

On the same day the new second-class cruiser *Glasgow* was launched from the works of the Fairfield Shipbuilding and Engineering Co. at Glasgow. She is the first of the five new cruisers of the *Town* class to take the water, the contracts for which were placed in November last at Fairfield, Clydebank, Dalmuir, Barrow and Elswick. Her dimensions are as follows:—Length, 453 feet over all; beam, 47 feet; draught, 15 feet 3 inches, with a displacement of 4,820 tons. The ship will be provided with Parson's turbines to develop 22,000-I.H.P., and give a speed of 25 knots. The armament will consist of two 6-inch Q.F. and ten 4-inch Q.F. guns, with two 18-inch broadside submerged torpedo tubes; one of the 6-inch guns will be mounted on the forecastle, where the conning tower—constructed of special steel—will also be placed, the other 6-inch gun will be mounted aft, and five of the 4-inch guns on each broadside. Protection to the vital parts will be provided by a curved steel protective deck extending the whole length of the ship, and further protection to the machinery will be afforded by the bunkers.

Abandonment of the Salvage of "C 11."—After a series of efforts lasting some nine weeks, the attempt to salve submarine "C 11" has been finally abandoned, the *Vindictive*, with the two dockyard tugs and the

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salvage lighters, returning to Sheerness on the 18th ult.; before leaving the spot, a funeral service was held on the quarter-deck of the *Vindictive*, three volleys being fired and the "Last Post" being sounded at its conclusion. Before leaving Haisborough, soundings were taken for the last time, and it was then found that the submarine was completely buried in a sand heap. During the salvage operations there were only twelve days on which work was possible, and on three occasions the weather was so bad that the salvage vessels had to seek shelter. The submarine had been lifted and slung to the lighters, but when being towed in, she was brought to a standstill by some obstruction, supposed to be another wreck, and further progress with her was found to be impossible.

Australia. *Remarks on Colonel Foster's Articles on "The Defence of Australia," by Captain W. R. Cresswell, C.M.G., R.N., Director, Commonwealth Naval Forces (concluded). Laid by order before the Commonwealth Parliament* :—

Colonel Foster's View not in Accord with Present-day Conditions.

The quotation from C. J. Fox is evidently given to oppose the idea of national military training; but it is odd that Colonel Foster should be opposed to a project that relieves the stress upon the Mother Country in all the various Imperial services which he enumerates, due to the existence of foreign bases in our proximity. His is the counsel familiar to us from the Colonial Defence Committee of nearly a generation past, some of it due to a habit of mind attuned to a fixed order of things in a land already at its full development, where change is slow. This mental poise is not only quite out of place, but dangerous in a country at the beginning of its history, which has as its nearest neighbours lands and peoples of immeasurable possibilities, giving many evidences of restlessness under the increasing influence of Western civilisation.

Colonel Foster Objects to Local Defence and Ignores Commerce Defence.

Our critic might be inclined to qualify his estimate of "how little purely local defence is required to guard Australia from aggression" if he realised that this means no local defence at all by sea, except for the squadron maintained under the current Naval Agreement. Here, on more familiar ground, I may venture to differ diametrically from Colonel Foster's views. A Director of Military Studies need not, of course, be regarded as including naval war in his acquirements, but its principles merit something more than airy dismissal. The sea defence and sea capacity of a people are not altogether unimportant in a land with an unbroken sea frontier. There is, to begin with, that homely interest called "Commerce," "Trade" from which we most of us either directly or indirectly get our livelihood in this work-a-day land. Its annual worth to Australia is some £170,000,000. Its consideration has failed to receive honourable mention in Colonel Foster's paper on Australian Defence, but, at the pain of introducing such an item into high defence science, some notice must be accorded it. "The naval force (Imperial), which, though small hostile expeditions may evade it, can certainly stop large ones," says Colonel Foster; but still smaller expeditions of a raiding cruiser or two may, and

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certainly will, also evade it with far greater ease, particularly to attain the lucky position of having the commerce of Australia at their mercy. Whether the captains of cruisers will prefer to expose their ships to being shelled from forts rather than pick up rich prizes, out of the range of the fort guns, along our coasts (and colliers if coal be needed), will depend solely on their sanity.

Likelihood of Commerce Destruction Admitted.

The mere fact of armed forces being required by us to prevent raiding landings presupposes, first, that their coming to these coasts is *probable;* second, that they can land, since it is probable the Navy may be absent from the point of attack on other and more vitally important work; and, third, that the time and occasion sufficient for landing would more than suffice for the destruction of our coastal commerce. If Colonel Foster proposes, as some other high authorities have believed, that our coastal traffic should cease, and the ships take refuge in port, then he would inflict on the community a daily loss in business that, captures apart, would pay for about two destroyer flotillas of eight vessels each per week. An industrial paralysis and distress would result, made bitter and harder to endure by the reflection that it could have been prevented with ease, but for the counsel of those who failed to grasp the effect of the modern situation on Australia. The loss would not be ours alone, for any interruption of the flow of food and of wool across the high seas would close many British factories, intensifying the distress of the working classes, and lessening the country's war power.

As for the best means of safeguarding our coast from raiders in war, I would refer the Director of Military Studies to the report of a Naval Officers' Committee on the subject (1906), in which an establishment of four ocean destroyers, sixteen *Teviot* class destroyers, and four first-class torpedo boats is recommended. If he has any doubt of the ability of that force to make the Australian coast routes too uncomfortable as a hunting ground for the raiding cruiser, he is commended to any naval officer, preferably one with destroyer service experience, with the enquiry as to whether, if placed in command of that force, he would feel equal to securing the safety of commerce against four unarmoured raiders.

Adverse Criticism of Torpedo Boats and Destroyers Met.

The adverse criticism of torpedo boats and submarines is hardly convincing. It is presumed that torpedo boats include destroyers, which are now used as open sea torpedo boats. They are written off as requiring "highly specialised crews," and therefore inferentially, in Colonel Foster's opinion, beyond Australian capacity. To this it is sufficient to say, as to torpedo boats, that they have been on the establishment of the Victorian Division, and used and regularly exercised since 1885, and the Director of Military Studies would be welcomed as a visitor during the training months at the Naval Depôt at Swan Island, Queenscliff, or whenever he cares to do the depôt the honour of a visit.

Submarines apart, with their highly specialised crews and limited spheres of action, it is clear that Colonel Foster underrates the efficiency of

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torpedo attack. His Tsushima figures are not sufficient; and, besides, the gyroscope and increased range have made a complete change in torpedo efficiency. If not, we should hear of some decrease of the number of destroyers ordered and built, instead of their continuous increase. We have been fortunate, too, as to hear personally from the first of torpedo authorities criticism of some value of the various torpedo boat attacks by the Japanese, and this criticism did not point to any fall in the value in which British destroyers and torpedo craft are estimated as war implements in the Royal Navy.

Colonel Foster's despair of our coastal defence by torpedo craft, either because torpedo boats want specialised crews, or because it is "sometimes rough," cannot be accepted as the last word on the subject, nor induce consent to the alternative that our coasts may be left clear for "small hostile expeditions" to batten on our commerce, and paralyse the country's business.

Australian Naval Co-operation.

It would be of advantage if we could learn what it is that really stands in the way of naval co-operation by Australia. To drive a cruiser away with a 6-inch gun from a fort is quite orthodox and correct war; but to have such a gun afloat and drive the enemy not only beyond damaging distance of the port, but of the trade on which the port lives, is somehow wrong. Similarly, it is proper and correct war to cross the seas and attack with our land forces the enemy's bases, which might be jumping-off places and coaling stations for raiding cruisers, but of ourselves or of our own efforts to attack and destroy on the intervening seas the vessels using those bases is quite improper. Why may we not aid the Empire and safeguard ourselves by doing these things? It would be useful to learn on what logical grounds such ideas can be justified, for they evidently underlie Colonel Foster's naval views.

We would recommend, as a fair precedent of what we might expect under the circumstances he would place us in, the case of a people similarly situated and conditioned to ourselves, a fringe population occupying a wide range of latitude, and with consequently a wide distribution of products, and also, like ourselves, largely or entirely dependent on the coastal traffic route for the exchange of those products for their daily food and business. Unfortunately, they utterly neglected the defence of their coastal route, and thought they need only defend their ports. This precedent will be found in the American war of 1812 (Captain Mahan), and the destitution of the States inflicted on them by the enterprise of hostile cruisers is precisely the fate we should meet by adopting the same short-sighted policy. The importance of a country's commerce is not one that can be left out of consideration in any defence policy. The development to the fullest of our defence capacity by national training and the securing of our coasts by an efficient coastal flotilla are the first steps to be undertaken. A land force without means of gaining intelligence seaward in an island country, except by cables, which might be cut, is at a hopeless disadvantage. The land and sea forces are complements of one another, and in their gradual growth and development is our only hope of adequately preparing to meet the heavy work which may be soon awaiting us.

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Our Present Position—Doctrine of Complacency Fatal.

In the matter of defence generally, there appears to be failure to realise that causes and conditions that have affected other people must similarly affect ourselves. A dead angle, a blind spot, in our mental outlook is discovered whenever our own case is under review. It is not realised that what has happened to other peoples and nations must, under similar conditions, happen to us. British sea supremacy for a century, and in Australia the added safety of thousands of miles of ocean, have been the main contributing causes to our indifference. The merest outline knowledge of history, and a glance at a map of the world, noting the rapid rise in sea power of certain nations, and their necessities for natural expansion, must convey a warning. Do we expect that the upward grade in the curve of the strength of foreign Navies will cease or be reversed at the point when further ascent will render our position here insecure? It would seem so. Yet there is nothing more certain than that it will not. And are we to wait patiently or in perfect oblivion of this until the situation is one beyond our power to remedy? In every-day life it is best, we are told, to take "short views." Those responsible for national security cannot restrict their view to a less period than a generation ahead. The easy complacency of to-day is the most powerful ally of Australia's future foe, and we can only be aroused from it by a realisation of the cold, sober facts of our position, which should surely awaken us, though these are hard to state without their smacking of the oratorical or sensational. They were plainly and seriously considered by our late Governor-General, speaking with full knowledge and authority, and with all the impressiveness of the occasion—his last words in Australia. Could anything be in greater contrast to Lord Northcote's warning than Colonel Foster's statement that "we cannot fail to see how little purely local defence is required to guard Australia from aggression"?

Claiming no special authority for my views, except that they are those of a naval officer who has been an anxious student of the dangers and needs of Australia, I am fully alive to the presumption of criticising the opinions held by Colonel Foster, Director of Military Studies to the University of Sydney. I honestly think them of great value and importance to us, but make the suggestion, in all modesty, that his outlook is too restricted to technical military study to cover the far wider field of national strategy, and the trend of the growth of the peoples and the forces affecting us. These should have a far larger part in our minds if we are to succeed in devising the lines of defence within which our national growth can be developed in security.

W. R. CRESWELL, *Captain*,
Naval Director.

France. The following are the principal promotions and appointments which have been made:—

Rear-Admirals—L. V. Marin-Darbel to be Vice-Admiral; P. P. Lecuve to command of Tunis Naval Division and Navy of the Regency. Capitaines de Vaisseau—L. R. Dartige du Fournet to Rear-Admiral; E. N. Benoit to "St. Louis"; M. L. Delafon to "Bretagne" and Boys' Training School;

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F. Fournet to "Carnot"; J. F. Amet to "Dunois" and command of the Second Torpedo and Submarine Flotillas of the Channel; C. De Marliave to "Lahire" and command of First Torpedo and Submarine Flotillas of the Mediterranean; L. A. Mottez to "Cassini" and command of First Torpedo and Submarine Flotillas of the Channel; Z. A. Schwerer to "Justice"; P. A. De Gueydon to "Borda"; A. A. Tracou to "Vérité"; F. M. Lahalle to "Victor-Hugo." Capitaines de Frégate—C. L. Estienne to "Bombarde" and First Ocean Torpedo Flotilla; F. A. Boyer to "Javeline" and Third Ocean Torpedo Flotilla.—*Journal Officiel de la République Française.*

Report of the Parliamentary Commission of Enquiry into the State of the Navy.—The following abridgement of the *Rapport* of the Parliamentary Commission, under the presidency of M. Delcassé, appointed by the Chamber to report on the condition of the Navy, is given by the *Temps*:—

I.—*Naval Construction.*

The Commission having ascertained that in the last ten years Parliament has been asked to authorise the commencement of ships, the plans of which, for the most part, had not been definitely decided on.

That months and years generally separate the different contracts for hull, turrets, boilers, etc., entailing a considerable loss of time and money, and that this has been notably the case with the battleships of the *Patrie* class and the armoured cruisers *Waldeck-Rousseau*, *Ernest-Renan*, and *Edgar-Quinet*.

That, moreover, important changes have been made during the building of ships, notably as regards the artillery of the *Justice*, *Démocratie*, *Liberté*, *Vérité*, and the armoured cruisers *Ernest-Renan*, *Waldeck-Rousseau*, and *Edgar-Quinet*, changes which tend to destroy homogeniety—one of the most important characteristics of a good fleet.

That the greater part of these defects are aggravated in the six battleships of the *Danton* class, the preliminary contract for which, signed in December, 1906, has had hundreds of changes made in it since.

Proposes to the Chamber:—

1. To severely blame such proceedings, which are prejudicial to the public finances, and incompatible with rational, methodical and rapid construction.
2. And that it should decide that henceforth it will only authorise the construction of a ship after receiving assurances that the plans are at least in all essential particulars definitely drawn and the contract ready for signing.

II.—*Arsenals.*

The Commission having ascertained that our naval arsenals are not actually in a condition to satisfactorily and with requisite rapidity carry on at the same time both new construction and repairs to ships of the fleet.

That tools and machinery are, generally speaking, insufficient and out of date.

That the abolition of piecework coincident with a reduction in the daily hours of labour, and the weakening of the power and authority of

France.

the heads of departments, has been the consequence of a notable diminution in production.

That a want of material has sometimes caused a stoppage of work.

Proposes to the Chamber to decide :—

That in the interests of the Navy, as well as of the public finances, our arsenals be supplied with modern tools and machinery to admit of a *maximum* production in a *minimum* time.

That it must be firmly maintained that work goes on for a full eight hours daily.

That piece work be re-introduced as far as possible, together with equitable remuneration, experiences at Brest and Ruelle having shown that its introduction has produced excellent results.

That in certain workshops, where it would not be advisable to introduce piece work, the workmen to receive sufficient wages to make up the difference.

That the decree of 13th June, 1907, be revised so as to give heads of departments greater powers of reward and punishment.

That before sending any work to be carried out by a private firm it be ascertained whether the arsenals are in a position to undertake it.

And for the prompt execution of work often delayed by reference to the Central Authority, greater power of decision be vested in the *Préfets Maritimes* and the Commanders-in-Chief of the squadrons.

III.—*Contracts for the Navy.*

The Commission having ascertained

That prices of materials for the Navy have increased of late.

That the prices of turbine engines in particular appear excessive.

That this increase in price may be attributed in great measure to the fact that the Navy Contracts department does not stand out sufficiently against the demands of contractors, and that too many useless clauses are inserted in the contracts.

Proposes to the Chamber :—

To request the Control department to endeavour by every means to obtain a reduction of prices, particularly by the suppression of certain penalties in the terms of contract which are of no use to the Navy.

To abolish, except in certain cases, all premiums to contractors, simply requiring the results which are thought necessary and sufficient.

IV.—*Boilers.*

The Commission proposes that the Chamber should express its regret :—

1. That for the past ten years Ministers of Marine have neglected to employ competition to obtain a reduction of prices in the purchase of two boilers which are considered the best;
2. That the Minister of Marine, having in a letter of 5th August, 1905, consulted the technical committee as to the type of boiler to be adopted for the *Edgar-Quinet* and *Waldeck-Rousseau*, did not afterwards apply for tenders from the four firms designated by the committee, but selected two firms only from the list supplied;

France.

3. That for the six battleships of the *Danton* class, the Minister, without even consulting the Technical Committee, took upon himself to order an equal number of boilers from the before-mentioned two firms;

4. That in his selection of boilers the Minister has not, in the majority of cases, chosen the type which the Commission of Enquiry have found to be most in favour with naval engineers and mechanicians;

And decides that henceforth, unless it be explained to Parliament that it is impossible, tenders shall always be asked for from all the firms recommended by the Technical Committee.

V.—*Artillery.*

The Commission having ascertained

That the four divisions of battleships and the division of armoured cruisers of the Mediterranean Fleet have not their full allowance of steel shell on board.

That the two divisions of armoured cruisers of the Northern Squadron have not the third of their regulation supply of those projectiles.

That for both the Mediterranean and Northern Squadrons there is no reserve stock of steel shell ready.

Considering

That it appears from the statements of the Minister of Marine and the artillery department that the problem regarding steel explosive shell was decided for small calibre guns in 1905 and for heavy guns in 1906,

Proposes to the Chamber

To express its serious regret that the necessary diligence has not been shown during the last three years to furnish our squadrons with this projectile and to constitute a reserve stock.

The Commission having also ascertained

That it was only towards the end of February, 1909, that the pattern of shell was decided on for the six battleships of the *Danton* class which were ordered in December, 1906, and are due to be completed in December, 1910, and that the time is now too short to allow of the necessary quantity of shell being manufactured by the latter date, and that also no credit has been taken in the Budget of 1909, for this purpose,

Proposes to the Chamber

To blame the improvidence and dilatoriness which this situation reveals.

VI.—*Docks and Arsenals.*

The Commission having ascertained

That the programme of works drawn up in 1901 to place the military ports in a position to deal with the new ship construction of 1900 has only been partly executed,

France.

That nothing has been done up to the present to provide docking accommodation for the battleships of the 1906 programme,

Proposes to the Chamber

To blame the improvidence and carelessness which these facts display.

VII.—*Central Administration.*

The Commission having ascertained

That neither unity of views, co-operation, method nor definite responsibility exists between the different branches of the central administration, and that there is too often negligence and confusion,

Proposes to the Chamber

To order a reorganisation of the central administration, which will assure co-ordination of effort and leave the head of each great department responsible for carrying out the measures which have been decided upon after collective deliberation under the presidency of the Minister.

This report of the Commission of Inquiry has been, and still is being, debated in the Chamber, and resulted indirectly in the fall of the Clemenceau Ministry on 18th July.

Committee's Report on the "Danton's" Mishap. — The committee ordered to inquire as to the causes of the failure to launch the battleship *Danton* at Brest has reported the following reasons:—

1. The new method of greasing the ways resulted in a part of the fatty matter being absorbed and part floating away on the water, which rose higher than expected on the day of launching.
2. The resistance presented by the large area of the stern when taking the water.
3. The incline given to the ways was not sufficiently steep.
4. The *Danton* having started under bad conditions, moved slower and slower until she brought up.

The Naval Programme.—It is stated that the *Conseil Supérieur de la Marine* at its recent meeting at the Elysée came to a definite conclusion regarding the future constitution of the French fleet, which is to be as follows:—

45 battleships.
12 scouting cruisers.
60 destroyers (sea-going).
84 destroyers for mobile defence.
64 submarines.

It will be remembered that the 1900 programme is as follows:—

28 first-class battleships.
24 armoured cruisers.
52 destroyers.
263 Torpedo boats.
38 submarines.

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And when the Budget for 1907 was introduced with the *Danton* class of battleship it was stated by the Admiralty that in theory the constitution of the fleet had been fixed as follows:—

38 battleships.
20 armoured cruisers.
6 scouts.
109 destroyers.
170 torpedo boats.
82 submarines (for offence).
49 submarines (for defence).

Taken together, these three programmes show that the constitution of the fleet is to be changed both in the number of armoured ships and the importance assigned to each class of ship. The number of battleships has increased, armoured cruisers have disappeared, as also have torpedo boats. Less importance is given to submarines, and in their place scout cruisers and destroyers are given greater prominence. Thus, according to the programme of the *Conseil Supérieur de la Marine*, real military value is only given to the battleship, the scout cruiser, and the destroyer.

The date limit for the completion of the battleships is given as 1925, and as the life of a battleship is fixed at 25 years, it follows that at that date the only battleships now built fit for service will be the six of the *Patrie* and six of the *Danton* class. In the sixteen years to come, therefore, it will be necessary to build 33 new battleships, 12 new scout cruisers, and more than 100 destroyers, besides submarines, so that this new programme is a vast and expensive one.—*Le Temps.*

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Naval Bureau of Ordnance.—Denying the widely-circulated statement that our latest type 12-inch guns are inferior in power to those of foreign Navies, Rear-Admiral N. E. Mason, Chief of the Bureau of Ordnance, U.S. Navy, in his annual report asserts that the 12-inch guns mounted on the eight latest battle-ships already in commission in our Navy, are equal or superior in power to any 12-inch gun afloat anywhere in the world, and the 12-inch guns of our battle-ships in course of construction will be equal or superior in power to any 12-inch foreign gun of which authentic information can be had. Early in the year the Bureau completed the design of a 14-inch gun, designed to fire a 1,400-pound projectile. All the minor difficulties originally experienced with the 3-inch semi-automatic gun and mount have been overcome, and these guns are being rapidly completed and installed on board ship to replace 3-pounder and 6-pounder guns. The 5-inch gun and mount, tested at the naval proving ground, have given satisfactory tests. The gun uses a cartridge case, and will have a service muzzle velocity of 3,150 foot-seconds, using a fifty-pound projectile. It is especially adapted for use in torpedo defence.

The only important ordnance development of the year was the adoption of a new form of projectile with less air resistance and a material increase in flatness of trajectory and striking energy at long ranges. Recommendation is made for authority to purchase ordnance material in

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limited quantities abroad in case of urgent need, to purchase articles, the character of which or the ingredients of which are of such a nature that the interests of the public service would be injured by publicly divulging them, in such manner as he may deem most economical and efficient.

Satisfactory results having been obtained in experiments in arranging air ducts for gas-ejector attachments, all guns are now being manufactured with the most efficient arrangement. The principle of using a closed turret and keeping the turret chamber under a moderate air pressure has been approved. The arrangement also ventilates the turrets in action. The turret gun mounts of the *Florida* and *Utah* will be practically of the same type as those of the *Michigan* and *Delaware* classes. The ammunition hoists for all these vessels will be of the two-stage type, but differing in details for each class. Hand hoists will be installed in the turrets of all three classes, and in all future turret installations. Those of the *Florida* and *Delaware* classes will be entirely independent of the main hoists, but there is not sufficient room for independent hand hoists in the *Michigan* class, which made it necessary to fit the main hoists with mechanisms for both power and hand purposes. For all classes the complete separation of the gun chambers from the handling room is insured at all times. The stowage of the necessary electrical apparatus in the earlier type of turret installations has been arranged so as to render the apparatus practically innocuous. Centre-line bulk-heads have also been fitted in the double-gun turrets to increase the safety of loading operations of either gun, and, where possible, will be fitted in vessels now refitting. A trial installation of the trunked-in single stage hoist has been placed in the 12-inch turrets of the *Idaho*, and one will be placed in the 13-inch turrets of the *Oregon*. Trial installations of the independent hand hoists are also to be tested in the turrets of the *Idaho* and *Oregon*, and if proved efficient all turrets should be similarly fitted. The hand-worked power hoist and rammer equipments of the 8-inch turrets of the *Vermont* and *Louisiana* have proved so satisfactory on the Pacific cruise of these ships that a similar change has been made in the 8-inch turrets of all vessels in commission, except the *Kentucky*, *Kearsage* and *Olympia*, and will be made in the 8-inch turrets of ships now refitting. The advantages of hand installations in 8-inch turrets are complete separation of turret chambers from handling rooms at all times, much less liability to breakdowns, and increased rapidity of fire. Friction training gear for broadside mounts has been installed on all modern 6-inch mounts in service, and is being installed on 5-inch mounts. The modernising of the mounts of the 4-inch and 5-inch 40-calibre guns and furnishing them with new telescope yoke sights have progressed satisfactorily. Reports from all ships show that the telescopes and sights of the later type for all calibres are satisfactory. The efficiency of the 7-inch guns was demonstrated by the last record target practice, but there is need of an improved type of elevating and training gear for this gun where there is a considerable swell.

Fire control systems and instruments have been installed on eighteen battle-ships in the year, including all those of the Atlantic Fleet, and the work is well advanced on the armoured cruisers and the *Charleston* class. Range-finders of two new types and of domestic manufacture have been contracted for for some of the new ships. The larger ships are equipped with range-finders of greater range and accuracy. The present range-

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finders will be used on the smaller cruisers and gun-boats. New ammunition hoist motors of greater power should be provided for many of the older vessels. The automatic ammunition hoist motor controller should be fitted to all turret hoist motors and the mechanical control gear for elevating motors of turret guns to all turret guns. All recent types of turret sights have given satisfaction in service. Important improvements will be made in the turret installations of the *Idaho*, *Massachusetts* and *Oregon*.

The situation as to the reserve supply of powder which the Bureau has been accumulating for the last two years is much improved, although the supply is not as large as it should be. The Navy and the Army now purchase and manufacture their powder under exactly the same conditions with resultant economy. The powder has not been changed, and in battle we could do better shooting with it than with any other kind, despite whatever may be the disadvantages as regards cost, lack of keeping qualities, tendency to "flarebacks," etc. Our powder contains no nitro-glycerine, and Services formerly favouring nitro-glycerine powders now show a disposition to abandon them. Magazine refrigeration is recommended as capable of trebling the life of powder on board ship. At present there is no material or method which will make any smokeless powder able to withstand storage conditions on board ship for indefinite periods. A laboratory has been established in the Philippines for testing and watching powder.

Armour-piercing projectiles, loaded with high-explosive bursting charges, will in the future comprise the entire battle supply for the main batteries of capital ships. The reserve supply of these is much too small. With the aid of private firms there has been developed a new design for armour-piercers which gives vastly improved accuracy and longer ranges. This improvement is the longest step in advance in ordnance material for several years. Minor improvements increasing the reliability and convenience of cartridge cases, powder tanks, cartridge bags, etc., and reducing the cost of manufacture have been made. The cruise of the fleet in the Pacific has amply justified the recommendation in previous reports for two ammunition ships for use with the Atlantic and Pacific Fleets. The desirability of replacing all rifles and machine guns of rifle calibre now in the Navy with the type now used in the Army and National Guard is emphasised as in previous reports. Through the designing of improved dotters, the Morris-tube rifle can be abandoned and gun pointers can receive more accurate training without the danger attending the use of rifles on board ships. Improved sub-calibre attachments for both turret and broadside guns will soon be available for issue.

The supply of torpedoes is still unsatisfactory; but torpedo-vessels may soon be supplied with torpedoes of an efficient type for target practice owing to the ordering of torpedoes abroad. The converting of twenty large torpedo-boats has been begun. The future needs of the Service may call for increasing the capacity of the torpedo factory at Newport, which now has a capacity of only fifty torpedoes a year, whereas, even without any shortage as now exists, at least 100 torpedoes will be needed each year. The manufacture of 5-metre by 21-inch submerged torpedo-tubes has progressed, so that tubes can now be installed as vessels become available. An improved type of central pivot tube is being designed for the new

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destroyers. A contract has been let for ninety-five mines of a new type which can be planted from a large vessel, and estimates provide for mine outfits for one mine-ship. Plans are being formed for a torpedo station on the Pacific Coast. An item of 200,000 dollars is included in the estimates for the expense of tests of ordnance material. An annual fund for experimental work is now a necessity.

During the year 203 guns of all calibres, from 1-pounder to 12-inch, have been completed at the Naval Gun Factory, and 408 have been well advanced; sights and sight fittings have been made for 398 guns and partially made for 474 guns; gun mounts have been manufactured in numbers corresponding to new guns of all calibres; and at the same time an immense amount of work has been done in the way of modifying and improving both guns and mounts of older types in service. During the three months preceding the departure of the Atlantic Fleet from Hampton Roads for the Pacific, 595 shipments were made from the gun factory, aggregating 3,091,536 pounds, and consisting of 2,827 boxes and crates, in which were 146,786 pieces of manufactured ordnance. Progress in armour-piercing shell of large calibre is almost at a standstill at the naval proving ground and powder factory of Indian Head, Md. Great difficulty seems to be encountered in furnishing 12-inch armour-piercers that meet the several requirements. In the first ten months of the fiscal year the powder factory made 912,293 pounds of new powder, besides working into good powder 107,381 pounds.

The demand for officers for sea duty in the year made it impracticable to maintain a class under instruction in ordnance. It is practically impossible for any officer to become an expert in ordnance with the limited experience to be obtained on board ship, and success as an ordnance expert calls for the taking up of this line of work early in one's career. The elimination by the Department of the estimates for increase in salary for the civilian force is viewed with regret by the Chief of the Bureau.—*Army and Navy Journal.*

MILITARY NOTES.

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The following are the principal appointments which have been made:—Colonels—G. G. A. Egerton, C.B., to command Infantry Brigade at Malta, with temporary rank as Brigadier-General; P. S. Wilkinson, to be Inspector-General of West African Frontier Force, with temporary rank as Brigadier-General; J. A. L. Haldane, C.B., D.S.O., General Staff (Eastern Command), with temporary rank as Brigadier-General; E. A. Fanshawe to command Artillery (6th Division, Irish Command), with temporary rank as Brigadier-General; S. R. Rice to be Chief Engineer (South-Western Coast Defences); W. N. Congreve, V.C., M.V.O., to be Commandant School of Musketry, Hythe; J. A. Ferrier, C.B., D.S.O., to be Commandant of the School of Military Engineering.

Indian Army.—Lieut.-General—Sir B. Duff, K.C.B., K.C.V.O., C.I.E., to be Military Secretary at the India Office. Major-Generals—Sir D. Haig, K.C.V.O., C.B., to be Chief of the Staff; C. St. L. Barter, C.V.O., C.B., to command of Bombay Brigade (Southern Army). Colonels—E. H.

Home.

Rivett-Carnac to command of Ambala (Cavalry) Brigade (Northern Army); W. R. Birdwood, C.I.E., D.S.O., to command of Kohat Brigade, with temporary rank as Brigadier-General.

Interim Report of the Advisory Committee for Aeronautics :—

To the Right Honourable H. H. Asquith, M.P., First Lord of the Treasury.

MAY IT PLEASE YOUR LORDSHIP,—

The Advisory Committee for Aeronautics, appointed on 30th April, have the honour to present an interim report as follows :—

The Committee have held four meetings, two at the War Office, one at the Balloon Factory, Aldershot, when the work in progress there was inspected, and the fourth at the National Physical Laboratory.

In accordance with the arrangements made at the time of its appointment, the work of constructing and experimenting with either aeroplanes or dirigibles remains with the Government Departments with which the Committee is connected. It is the duty of the Committee to advise on questions submitted by those departments, to deliberate on and determine the scientific matters arising out of these questions, to arrange, when necessary, for experimental work at the National Physical Laboratory, and to advance the applications of the science of aeronautics by such means as may seem best. With these objects in view the work of the Committee has, for the present, been in the main preliminary in its character.

Reports as to existing knowledge.—In the first place it appeared desirable to obtain reports as to the present state of knowledge on the questions to be considered, while the information afforded by the reports has also formed the basis of the experimental work now being undertaken at the National Physical Laboratory. It is proposed later to publish in an accessible form such of these reports as contain matter of more general interest.

The reports already arranged for include the following :—

Memorandum by Mr. A. Mallock on general questions to be studied.

Report by Dr. T. E. Stanton on recent researches on the forces on plane surfaces in a uniform current of air.

Memorandum by Sir G. Greenhill on stability.

Memorandum by Sir G. Greenhill on the screw propeller.

Report by Dr. W. N. Shaw on wind structure, dealing especially with the phenomena of gusts, and on the variation of wind velocity with height.

Preliminary report by Mr. F. W. Lanchester on petrol motors for aeronautical purposes.

Report by Dr. W. Rosenhain on light alloys.

Report by the Secretary on existing knowledge on the subject of the accumulation of electrostatic charges on balloons, and the precautions to be adopted to avoid the dangers arising therefrom.

Additional reports are promised on other matters of importance. The Committee have also arranged for the preparation of abstracts of published papers and memoirs relating to aeronautics which are of special interest.

Preliminary Programme of Work.—With a view to determining the work to be undertaken first at the National Physical Laboratory, the following list of experiments was compiled :—

(I.) General Questions in Aerodynamics.

(1.) Determination of the vertical and horizontal components of the force on inclined planes in a horizontal current of air, especially for small angles of inclination to the current.
(2.) Determination of surface friction on plates exposed to a current of air.
(3.) Centre of pressure for inclined planes.
(4.) Distribution of pressure on inclined planes.
(5.) Pressure components, distribution of pressure and centre of pressure for curved surfaces of various forms.
(6.) Resistance to motion of bodies of different shapes; long and short cylinders, &c.
(7.) Combinations of planes; effect on pressure components of various arrangements of two or more planes.

(II.) Questions especially relating to Aeroplanes.

(8.) Resistance components for aeroplane models.
(9.) Resistance of struts and connections.
(10.) Resistance of different stabilising planes, both horizontal and vertical.
(11.) Problems connected with stability:—
  (i.) Mathematical investigation of stability.
  (ii.) The stability of aero curves of different section and of different plan (Turnbull's experiments).
  (iii.) Effect of stabilising planes, and investigation of questions as to their size and position.
  (iv.) Effect of rudder action.
  (v.) Effect of gusts of wind.
  (vi.) Investigations as to stability of models for different dispositions of weight, &c.
(12.) Materials for aeroplane construction.
(13.) Consideration of different forms of aeroplane, monoplane, biplane, &c.
(14.) Other forms of heavier than air machines, helicopters, &c.

(III.) Propeller Experiments.

(15.) Efficiency, and the effect on the efficiency of variations in blade area, pitch and slip.
(16.) Positions relative to the machine.

(IV.) Motors.

(17.) Efficiency.
(18.) Reliability and steadiness.
(19.) Materials of construction.
(20.) Design.

(V.) Questions especially relating to Airships.

(21.) Materials of construction, strength, &c.
  (i.) Alloys, wood, bamboo, &c.
  (ii.) Balloon fabrics.
  (iii.) Wires, cords.
(22.) Production of hydrogen.
(23.) Gas-tightness of fabrics.

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(24.) Detection of leakage.

(25.) Air resistance to ships of different form; experiments on models.

(i.) Effect of shape of ends.

(ii.) Effect of length.

(iii.) Variation with speed.

(iv.) Distribution of pressure as affecting stability, strength in construction, position of propellers, fins, &c.

(v.) Total resistance of models rigged to represent different balloons.

(26.) Questions as to stability of airships in different positions.

(27.) Stabilising and steering appliances, fins, rudders, &c.; form and position.

(28.) General design.

(29.) Navigation of airships. Mooring, &c.

(30.) Efficiency and position of propellers for airships.

(31.) Motors for airship work.

(VI.) Meteorology.

(32.) General information relating to variations of wind velocity and phenomena connected with gusts of wind.

(33.) Relative variation in speed and direction of the wind at different heights above the earth's surface.

(34.) Vertical movements in the air.

(35.) Rotary movements in the air.

(36.) Electrical phenomena.

(37.) Formation of clouds, snow, hail, &c.

In preparing this list the Committee received valuable assistance from Colonel Capper, the Superintendent of the Balloon Factory, who, at their request, visited the National Physical Laboratory to confer with the Director and Dr. Stanton, Superintendent of the Engineering Department.

Arrangements for Experimental Work.—After considering this list the Committee came to the conclusion that it was desirable that the following should be undertaken at once :—

(*a.*) Experiments on air resistance and on air friction as outlined in (1) to (7) above; and including experiments on models of airships and aeroplanes, resistances of wires and connecting stays, &c.

(*b.*) Motor tests.

(*c.*) Propeller experiments.

(*d.*) Tests for gas-tightness of materials suitable for dirigibles.

(*e.*) Experiments on the behaviour of different materials with reference to the accumulation of electrostatic charge, and generally as to means of protecting airships from the effect of electrical discharges.

Accordingly the Executive Committee of the Laboratory have, at the request of the Committee, made the necessary arrangements for carrying out this part of the work, and the Lords of H.M. Treasury have undertaken to include in the estimates for the work of the Laboratory presented to Parliament provision for the funds necessary.

The Committee trust that the following details of this part of their work may prove of interest :—

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Some addition to the existing buildings at the Laboratory has been found necessary to provide space for part of the experimental work, while a special building is also being provided for the whirling table referred to below. The equipment which is now being installed comprises the following :—

(i.) A wind channel 4 feet square and about 20 feet long, with a fan giving a draught of 40 feet per second, special arrangements being made to obtain a uniform flow. This will be employed for the determination of the air pressure components on plane and curved surfaces, for the resistance of models of airships and aeroplanes, and for observations on the centre of pressure, frictional resistance, stability, &c.

(ii.) A whirling table of about 70 feet diameter. For this a special building is being erected; the table itself is under construction in the Laboratory. It will be employed for a repetition of Dines' and Langley's experiments, as well as for propeller tests, which are urgently called for.

(iii.) Two wind towers for experiments in the open. These will enable some of the air-channel experiments to be repeated on a larger scale in the natural wind, and will, it is hoped, afford valuable information as to the varying conditions which obtain in practice.

(iv.) Apparatus for efficiency tests on high-speed motors up to 50 H.P.

In addition certain machine tools, &c., are being provided for workshop use.

For other necessary work the existing equipment in the various departments of the Laboratory will be available. Thus, strength tests on materials of construction can be made as required; work on light alloys is in progress; experiments on gas-tightness of balloon fabrics and on means of detection of leakage are being arranged. The tank now under construction for experiments on ship models will be provided with a carriage able to attain a velocity of 25 feet per second over a run of 500 feet, and will, it is hoped, also prove of value for air pressure and propeller experiments, while a lighter carriage could be designed for special experiments at higher speeds.

Communications with the Aeronautical Society, the Aero Club, and the Aerial League.—With a view to rendering their work as helpful as possible to all those who are engaged in practical aeronautical work the Committee put themselves in communication, during May, with the Aeronautical Society, the Aero Club and the Aerial League, and invited suggestions as to the directions in which the assistance of the Committee would be of most value. These bodies have undertaken to give the matter careful consideration, and to lay their views before the Advisory Committee at an early date; and at their last meeting the Committee received a letter from the Aerial League giving an account of the interesting programme the League propose to carry out. To this the Committee have replied that they will be glad to co-operate with the League in all such branches of their work as fall within the scope of the Committee.

Designs submitted by Inventors.—The position of the Committee with regard to inventions and ideas which their authors desire to be treated as confidential has been raised by various requests received.

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On this point the Committee have decided that it is not within their province, as a body advising Government Departments, to receive confidential communications from inventors and others which they are not free to use unreservedly in the advice it may be their duty to give to the Government.

Inventors wishing to bring their ideas before the Committee must previously take the steps necessary to protect their inventions, unless they are prepared to allow the Committee to use them freely in their work.

Confidential communications forwarded to the Admiralty or the War Office will be dealt with by these Departments as they may judge desirable.

Signed on behalf of the Committee,
RAYLEIGH,
24th July, 1909. President.

Members of the Committee.—The Right Honourable Lord Rayleigh, O.M., F.R.S. (President); Dr. R. T. Glazebrook, F.R.S. (Chairman); Rear-Admiral R. H. Bacon, C.V.O., R.N.; Mr. Horace Darwin, F.R.S.; Sir G. Greenhill, F.R.S.; Major-General Sir C. F. Hadden, K.C.B.; Mr. F. W. Lanchester; Mr. H. R. A. Mallock, F.R.S.; Professor J. E. Petavel, F.R.S.; Dr. W. N. Shaw, F.R.S. Secretary, Mr. F. J. Selby.

Austria-Hungary.

Military Education of Young Men in Hungary.—The *Armeeblatt* states that the Hungarian Government has for some time past been attaching great importance to the military education of young men intended for officers and non-commissioned officers in the Army. In the principal towns of the country, the pupils in the two upper classes in the Secondary Schools, including even theological and law students, now go through a course of military drill.

The number of these classes is continually increasing, and there are now 141 of them.

The Minister of National Defence, who encourages by every means in his power these patriotic efforts, has, in agreement with the Minister of Education, appointed a committee, who have been organising at Budapest a prize competition between the schools and sporting clubs in rifle target practice and gymnastic exercises.

Modifications in the Department of Military Constructions.—All works not immediately connected with fortifications have been, up to the present, entrusted to a special corps styled the *Militärbauingenieure*. The corps for the future is to be known as the *Ingenieur-offiziers-Korps*, and its strength has been increased by :—

1 Engineer general, ranking as a lieut.-general;
1 Engineer general, ranking as a major-general;
21 Chief Engineers, ranking with colonels, lieut.-colonels and majors;
11 Engineers, ranking as captains;
11 Assistant-Engineers, ranking as lieutenants.

The total of the engineers of all classes being raised from 110 to 155.

The secondary *personnel*, consisting of directors of works, clerks and heads of workshops, is raised from 418 to 528 (217 clerks, 72 directors of works, and 239 heads of workshops).—*Revue Militaire des Armées Etrangères.*

Austria-Hungary.

What a War with Servia would Cost.—A study recently appeared in *Danzer's Armée-Zeitung* as to the expense which a war between Servia, Montenegro and Austria would entail, and the effect it would have on the financial situation in the Dual Monarchy.

The author, who is anonymous, gives his views as follows:—

For a population of a little more than two millions and a half of inhabitants, Servia has more than 400,000 men fit to bear arms; but that does not mean that she has an army of this strength, first, because a large proportion of these men have no real military training, and secondly, because the supply of arms and munitions do not nearly suffice for an effective of this strength.

A short time ago the Minister of War declared that—if the credits he asked for were granted—Servia would, in a few weeks time, dispose of an army of 250,000 men ready to take the field.

This would seem to be a somewhat exaggerated estimate. Two hundred and fifty thousand men represents 10 per cent. of the whole population; it would mean for Austria an army of 4 millions and a half, a number which could never be reached in reality. In 1870, Germany only called out 3 per cent., and France 4 per cent. of the whole number of the population.

The simultaneous employment on the same field of battle of the whole army can neved be counted upon, because deductions must be made for the garrisons of fortified towns, reliefs, new formations, etc. Without wishing in any way to under-estimate the possible force of the enemy, it is yet probable that the field army would not exceed 160,000 men.

But no more than 110,000 men could be armed with magazine rifles and Q.F. guns, since there are only permanent *cadres* for this effective, which would form, in case of war, 6 divisions that could be compared with the troops we should employ. It would therefore appear that we ought to be in a position to ensure success if we employed 160,000 of our active army, that is to say, 4 Army Corps of 2 divisions each.

But if we are not at the same time brought face to face with another enemy—Italy or Russia—it would be better to make certain of a large numerical superiority in order to finish the campaign more speedily and with a *minimum* of loss.

We should be in a good condition for this if we opposed to the 160,000 men of the Servian field army, 240,000 men, that is 6 Army Corps, comprising 12 divisions. If we add 60,000 troops for the lines of communication, which could be improvised formations, we arrive at a total of 300,000 men.

Montenegro only numbers 247,000 men. But as the war would only be finished after the complete occupation of the country, it is necessary to take into calculation all the population capable of bearing arms, that is, from 40,000 to 50,000 men. Owing to the difficult nature of the country, it would be necessary to employ 100,000 troops of the first line. It would be necessary, in case of mobilisation of a part of the army, to call out the reservists in order to replace at any moment the sick and wounded, so as not to diminish the peace garrisons. However, as the resulting cost would be a small affair compared with the expenses of the field army, it need not be taken into consideration. We will calculate, then, the expenses for an effective force of 400,000 men. It is more difficult to give an idea of the probable length of the war.

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The most favourable contingency would be that where the Servian Army accepted a decisive battle in the open country which would allow us to utilise to the full our numerical superiority to crush it at one blow; there would then only remain desultory resistance here and there easy to overcome.

It is not at all probable that the Servians would accept such a risk. They would attempt, without doubt, to dispute the ground foot by foot, while avoiding exposing themselves to a complete and decisive defeat.

But even in this unfavourable case, as the theatre of war is small, and as our numerical superiority and the nature of the country permit us to act concentrically, one may take it that the principal resistance would be broken in two months from the date of mobilisation. We could then, after having disarmed the population, withdraw a part of the army and entrust to a special corps the work of destroying the armed bands which would, without doubt, be formed.

From 80,000 to 100,000 men might be occupied thus for four months. After these six months, it would probably only be necessary to leave a weak corps of occupation, the expense of which would not fall on the cost of the war.

The occupation of Montenegro would probably be more rapid. Nevertheless, to simplify matters, we may allow two months for the first period, after which we may allow from 20,000 to 30,000 men for a further period of four months.

In the Franco-German War, the expenses rose on the average to 6 marks (6 shillings) per man per day. But the cost of everything having increased, and in view of the special character of the war, we may allow an expenditure of 9 marks or 10·8 crowns per man per day.

But this amount does not include the assistance which would have to be rendered to the families of the reservists—assistance which would unavoidably be somewhat heavy. In order to cover this particular expense, we should have to reckon the expense per man per day at 12·50 crowns (10s. 5d.) in place of 10·80 (9s.).

The total amount, then, of what the war would cost may therefore be reckoned as follows:—

a. First Period: 400,000 men at 12·50 crowns (10s. 5d.) for two months, that is, 5 million crowns (£208,333 6s. 8d.) per day, or 300 millions (£12,500,000) for the two months.

b. Second Period: An average of 120,000 men at 12·50 crowns (10s. 5d.) for four months, that is, a million and a-half crowns (£62,500) per day, a total of 180 million crowns (£7,500,000).

This total of 480 million crowns (£20,000,000) includes all the expenses of the troops in the field, but not the pensions for the wounded, widows and orphans, nor the amount required for the renewal of the *matériel*. These last would probably amount to 100 million crowns (£4,166,666), while the pensions would probably amount to 20 million crowns (£833,333). If to the above figures are added the expenses incurred since last autumn, we arrive roughly at a round figure of 700 million crowns (£29,166,666), which could be covered by a loan at 4·5 per cent. interest, making an annual charge on the Budget of 60 million crowns (£2,500,000), part of which might later on be gradually borne by the occupied countries, although it would be impossible, owing to their poverty, to extract any war indemnity from them.

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For a Budget which amounts to several milliards of crowns, the new charge would not prove very heavy, and could be covered by a small increase of existing taxes. The economic union of Servia and Montenegro with ourselves would also offer some compensation in commerce and industry, while, furthermore, an important result of such a war would be to establish a barrier against foreign influences in the Balkans.—*Revue Militaire Générale.*

Germany.

Important Military Appointments.—In accordance with an Imperial Order of the 11th August, General of Cavalry von Einem has been relieved of his post as Minister of War, which he has held for six years (since 14th August, 1903), and has been appointed to the command of the VII. Army Corps at Münster in succession to General of Cavalry von Bernhardi, who has been placed on the retired list. The departure of General von Einem from the War Office is the matter of almost unanimous regret, alike in the Army and in the country, where the way he has carried out his duties has given general satisfaction. To him is due in particular the adoption of the new Q.F. field gun and the development in the employment for military purposes of automobiles and aerial navigation.

General von Einem has been succeeded as Minister of War by General of Infantry von Heeringen, Commander of the II. Army Corps (Stettin). He was born at Cassel in March, 1850, and as a Second-Lieutenant served with distinction in the war of 1870, where he won the Iron Cross of the 2nd Class, being badly wounded at the battle of Wörth. A large part of his career since has been spent on the General Staff, and he has been in command of the II. Army Corps since 24th September, 1906.

It is reported that General von Bernhardi has been relieved of his command as the result of a quarrel with the Count von Villers, at one time Commandant of the Münster Cuirassier Regiment and an Adjutant of the Kaiser, and who still remains a *persona gratissima* with him. As the result of this incident, his son, Lieut.-Colonel Graf von Villers, Commandant of the Driesen Cuirassier Regiment, has also sent in his resignation, which has been accepted, and he has been placed on the Reserve List of Officers with the rank of Colonel. General von Bernhardi is the well-known writer on military subjects, his works on cavalry having a world-wide reputation, and his unexpected compulsory retirement, which has thus prematurely deprived the Army, the country, and the Emperor of the services of one of the most eminent and most universally appreciated Generals, has excited considerable comment in Germany.

General Field-Marshal von Hahnke has been relieved, at his own request, of his duties as Commandant of the Mark of Brandenburg and Governor of Berlin, and been placed *zur disposition*, although his name will still be allowed to appear on the active list of general officers. He is succeeded by General of Infantry von Kessel, who for the last six years has been in command of the Guard Corps. General of Infantry von Loewenfeld, Commander of the X. Army Corps (Hannover), succeeds to the command of the Guard Corps.

Finally, Lieut.-General Emmich, Commandant of the 10th Division at Posen, is promoted to General and appointed to the vacant command of the X. Corps. General Emmich was born in 1848, entered the army in

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1866, and received his commission as Lieutenant in 1868. He is one of the very few officers who has risen to the command of an Army Corps, without having passed through the War Academy or having served on the Staff.

Experimental Firing at Balloons.—Some interesting rifle shooting experiments at captive balloons have recently been carried out. The first experiment took place at the rifle range, Jüterborg, near Berlin, against a small balloon some forty feet long, similar to those used for carrying the automatic apparatus employed for registering atmospheric variations. It is a pity, for the purposes of the experiment, that a car was not attached to it, in which dummy aeronauts could have been placed. The firing was first carried out by the depôt company, and then by the machine gun instructional company of the Musketry School. The wind was sufficiently variable and strong enough to keep the balloon on the move, so that it offered a shifting target to the firers. The distance was 1,250 yards, taken by the range-finder.

The depôt company first fired in five minutes some 4,800 rounds, the men firing sometimes on the knee, sometimes sitting. As the balloon continued to soar, the machine gun company took their turn at firing at it, firing 2,700 rounds in two minutes and a half; but they were no more successful than the others in bringing it down. When it was brought to the ground it was seen that there were 76 hits in its envelope, although the holes made allowed very little gas to escape. It would seem, as the result of the experiment, a gun alone, owing to the size of its projectile, will be able to destroy balloons.

Some further experiments were carried out in July at Darmstadt, the target being a captive balloon, 66 feet by 15, with a car attached, in which were placed two dummies representing aeronauts. The balloon, which floated at a height of between 400 and 500 yards, was fired at in succession by a company of infantry, a section of two machine guns, and a light howitzer battery.

The company, at a range from about 1,200 yards, fired 5,000 rounds without apparent result; then the machine guns, at the same distance, fired 4,000 rounds without bringing the balloon down; finally, the howitzer battery, placed at a distance of 2,000 yards, smashed the balloon up in two rounds, which descended slowly, its empty torn envelope forming a parachute. Only one of the dummies was struck by a bullet and that was in the leg.

It is considered probable that had the balloon been stationary it might ultimately have been brought down, though still at an enormous expense of ammunition, and the circumstances would be far more unfavourable were the balloons free. The German military authorities have therefore decided that infantry shall fire at a balloon only if it is near enough to enable them to hit the occupants of the car, and that the task of destroying the balloon itself or of rendering it incapable of proceeding shall be left to the artillery.

Types of Wheels to be Used for Heavy Weight Automobiles.—According to the *Post*, at a meeting of the German Association of Automobile Manufacturers, held on the 1st July of this year, at which representatives of the Minister of War and the communication troops were present, an

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important decision was arrived at, with regard to the dimensions of certain parts of heavy-weight automobiles.

After prolonged deliberations, an agreement was arrived at between the Automobile Manufacturers and the Indiarubber firms on the subject of the size of the wheels and the tyres to be employed for the future. In conformity with the proposals of the military authorities, the size of the wheels for the heavy-weight automobiles for four tons (a serviceable weight) constructed in Germany will be as follows:—

Fore wheels:—Rim to have an exterior diameter of 670 mm. (26·3 inches) and 120 mm. (4·6 inches) gauge. Hind wheels:—Rim, 850 mm. (33·4 inches), exterior diameter and gauge (double), of 140 mm. (5·3 inches). The total height of the wheels with the tyre will be:—Front, 830 mm. (32·7 inches); hind, 1,030 mm. (40·4 inches). The fixing of the tyre on the wheel by means of a groove was unanimously adopted.

The advantage to the military authorities of this decision will be great, as the wheels of the different vehicles required on mobilisation will now be interchangeable. Some other important questions relating to the subsidised cars were also discussed at the same meeting.—*Revue Militaire des Armées Etrangères* and *Revue de Cavalerie.*

Roumania.

The Superior School of War.—The Instructions in force at present fix the following general conditions which officers have to fulfil for admission to the School of War:—Candidates must be of the rank of either captain or lieutenant, under 35 years of age, with two years of active service in their grade, well reported on, of irreproachable conduct, of a robust constitution, with good general and military knowledge, and fit from every point of view to follow profitably the courses at the School.

Up to the present, candidates have undergone an entrance examination—set papers, *vivâ voce* and practical—bearing on the principal military branches, such as topography, geography and military history. For the future candidates will have to undergo a preparatory examination in their Army Corps.

This preparatory examination can be passed by officers either at their own request or on the suggestion of their Commanding Officer. In either one case or the other the application must be supported by documents showing that the officers are really conspicuous for their education, their character, their method of carrying out their duty, their capacity for work, and their energy.

The commanders of Corps forward at the same time to the Minister of War (General Staff), as the names of the proposed candidates, the certificates of birth, etc., a medical certificate, and a report on their financial position. According to these documents the Committee of the General Staff[1] prepares the list of the officers approved to go up for the entrance examination.

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[1] This Committee is composed of the Chief of the General Staff and his second, the heads of the two sections of the General Staff, the Director of the Military Survey Institute, and the Commandant of the School of War.

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The preparatory examination includes themes on tactics, military history and geography, fortification, artillery and target practice.

The definite admission examination embraces general history, the regulations for the three arms, the organisation of the army and military law; it includes, in addition, the solution of a tactical theme in the field, a topographical sketch, and an equitation test. The set papers are the same for all the candidates.

The questions are prepared by the examination committee of the School of War, and approved by the Chief of the General Staff. This committee examines and gives marks for the set papers of the preparatory examination. The definite examination takes place before a special commission, who not only determine the theoretical knowledge of the candidates, their judgment, and their aptitude of decision, but also if they know how to apply their theoretical knowledge to a concrete case, treat it logically, and express their ideas easily.

La France Militaire draws special attention to what it considers the two essential points of the new instructions. The first is that it is the Committee of the General Staff which decides the question as to the admission of candidates to the examination. That measure is logical, says the journal, since the principal object of the school is to provide recruits for the General Staff, and is the more to be commended since the list of candidates is decided by a body interested in obtaining good recruits for the Staff. The second point is the existence of a practical tactical test in the field, which allows of a sounder opinion being formed as to the capabilities of the candidates than is possible from a mere paper examination.

Reorganisation of the Artillery.—We have already recorded that under this year's Budget the number of field artillery regiments has been raised from 13 to 18, grouped in 9 brigades of 2 regiments in the proportion of one brigade per division. Some further details are now available.

The 18 field artillery regiments are made up of 75 mounted batteries, 24 *cadre* batteries, 5 howitzer batteries, and 1 mountain battery, which are divided as follows:—6 regiments of 4 mounted batteries each and 2 *cadre* batteries; 4 regiments of 4 mounted batteries; 1 *cadre* battery and 1 howitzer battery; 3 regiments of 5 mounted batteries and 1 *cadre* battery; 4 regiments of 4 mounted batteries and 1 *cadre* battery; 1 regiment of 4 mounted batteries, 1 *cadre* battery, 1 howitzer battery, and 1 mountain battery.

There are, in addition and independent, groups of horse artillery.

The batteries are armed with 4 Krupp Q.F. guns.

The *Independence Roumaine* further states that next year's Budget will provide for the creation of a so-called "communications" company, whose duty will be to study and apply all the modern technical inventions which can be used in the field. It will include, in addition to the Balloon Section, which will be attached to it, 5 other special sections, viz., wireless telegraphy, searchlights, automobiles, photography and carrier pigeons.

The work of this company will be superintended by technical officers of all arms who have made a special study of these subjects. We may also note that great facilities are now granted to Roumanian officers to follow technical courses of instruction abroad and to study foreign languages.—*Bulletin de la Presse et de la Bibliographie Militaires.*

CORRESPONDENCE.

HOW TO VISIT THE PENINSULAR BATTLE-FIELDS OF 1809 TO 1812.

To the Editor of the JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

SIR,

Having just returned from a visit to the Peninsular battle-fields of 1809 to 1812, of which the coming centenaries will be regarded with interest by soldiers at any rate, and probably by many others, it occurred to me that a few notes as to how best to see them might be of help to others who, like myself, do not know either Spanish or Portuguese, and who might be deterred by their want of knowledge of these languages from visiting out-of-the-way parts of Spain and Portugal.

It will be remembered that in consequence of the Convention of Cintra in 1808, Sir Arthur Wellesley returned to England, but that after Sir John Moore's retreat to Coruña he was sent out again in April, 1809 to command the British forces in Portugal, in hopes of driving out the French. In May, 1809 the passage of the Douro was forced at Oporto, and Soult was driven out of Portugal. Joseph and Victor were defeated at Talavera in July.

Massena entered Portugal in September, 1810, with 70,000 men, but suffered a sharp reverse at Busaco, and the reoccupation of the Portuguese capital by the French was prevented by the lines of Torres Vedras.

Retreating from his position facing the lines in March, 1811, covered by Ney in a series of brilliant rear guard actions, Massena made a last effort at Fuentes d'Oñoro in May, but was driven out of Portugal, repassing the frontier with only 45,000 men. Almeida was cleverly evacuated by Brennier. In the south, Elvas passed into our hands, and the battle of Albuera was fought to cover the investment of Badajos by Beresford.

Massena was superseded by Marmont, whose advance to relieve Ciudad Rodrigo, invested by Wellesley, in September, was checked at El Bodon.

In 1812 Ciudad Rodrigo and Badajos, the great frontier fortresses guarding the two main roads from Portugal into Spain, were captured by assault in January and March respectively, and in July Marmont's 40,000 men were badly beaten at Salamanca in forty minutes.

There are many lessons to be learnt on the ground which no study even of Napier can bring home, and it is interesting to note how Wellington's confidence in his own judgment seems to increase after each success in any particular branch of the military art, the culminating point, as far as the period 1809 to 1812 is concerned, being the confidence with which he manœuvred against Marmont in the Salamanca campaign, hoping his adversary might make some mistake, and the consummate skill with which he moved his troops the instant the opportunity came.

In turn each of Napoleon's successful war-tried marshals pitted against him fell before the great Englishman, at whose hands Napoleon himself suffered defeat at Waterloo in 1815.

The best time to select for the trip is after Christmas, and for choice the month of February. Military training has hardly begun, the shooting season is over, and of late years frost and fog have interfered with hunting, and it is early for fishing. The climate of England in February and March is not at its best, whereas the weather in Portugal is lovely, and the climate is most beneficial to anyone who has suffered in throat or lungs during the winter in England. Should time be no object, the Booth Line, starting from Liverpool, is perhaps the best, as it gives more time for seeing the ports, including Coruña. The address of the company is 30, James Street, Liverpool, and the steamers leave Liverpool about three times each month. If, however, the holiday cannot be extended over a month in the Peninsula, the best plan is to go by a boat of the Royal Mail Steamship Company (address 32, Cockspur Street, S.W.) direct to Lisbon, the best centre from which to start on your tours.

A special train takes passengers down from Waterloo, and the boats leave Southampton alternate Fridays, reaching Lisbon the following Monday, and returning from Lisbon alternate Wednesdays. At Lisbon the best hotel at which to put up is the Avenida Palace, as it has the advantage of adjoining the railway station (Rocio). It is as good as, and only slightly more expensive than, the Bragança on the high ground, or the Central on the Tagus. Cabs in Lisbon are very expensive, especially with luggage.

The coinage in Spain is in pesetas—about 28 to the sovereign. In Portugal it is in milreis—about 5,400 reis to the sovereign. A peseta is, therefore, worth rather less than a franc, and a 500 reis coin equals in value about two shillings of English money. Sovereigns are a convenient form of carrying money; but Messrs. T. Cook & Son (50, Rue Aurea, Lisbon) will accept a cheque for tickets. Expenses come to about £1 a day, including carriages, the charge for which is about sixpence a mile in the country; but an arrangement must always be come to before starting. In Lisbon itself trams convey you everywhere, as well as to the environs.

As regards books, though nothing comes up to Napier's "Peninsular War" and the sixth volume of the "Cambridge History," by Professor Oman, for all practical purposes Vol. I. of Sir Herbert Maxwell's "Life of Wellington" gives all the information necessary, except that there is no sketch of Albuera. The sketch of Busaco is apt to be misleading, as it does not show the three miles of ground on the right of the position, where Leith and Hill were at daybreak. The scale is omitted from the sketch of El Bodon, and there are a few places named in the text which do not appear in the maps. I would suggest taking all the books on the Peninsular War you can lay your hands on. They are always welcome in the train or in the evenings. Personally I carried in my pocket the small edition of Napier's "English Battles and Sieges in the Peninsula," extracted from the larger work, and published by John Murray, Albemarle Street, S.W. For use on the ground, I unpasted day by day the maps and sketches from Maxwell's "Life of Wellington," and put them in my pocket for reference, as the small edition of Napier has no maps.

For luggage, when travelling in Spain or Portugal, only take what will go in the railway or other carriage with you. In addition to a small bag or portmanteau and a dressing bag, take a small basket such as ladies carry their wool or work in, a rug, and umbrella, and of course field glasses

or telescope. Shooting boots are an essential, and either breeches or knickerbockers. Anything more required should be taken out and left in a separate trunk at the Avenida Hotel during tours. Clothes should be such as would be worn in England in February, but of rather lighter texture.

The wine of the country—collares—is cheap and good, and unless a flask is carried it is advisable always to have some of this, as well as some cold food in the above-named basket. The basket is easily carried, and when empty can be slung on the field glass straps.

Foreign "Bradshaw," pp. 298-301, gives all the trains necessary.

The Spaniards are more "stand-off" than the Portuguese, but the natives of both countries are most willing to make things easy for an "Inglese." A few words of Spanish go a long way, and French is often helpful in Portugal. Almost the only two words of everyday occurrence to which French or Latin would give no clue are "jantar" (Portuguese for dinner), and "mantechilla" (butter in Spanish).

The peasants have very good manners, and the lifting of the cap and "N'Dios," the equivalent of our "Good morning," should be returned. When taking off one's hat, the addition of the word "Señorita" seems to establish friendly relations at once, whatever may be the age or appearance of the recipient of the courtesy.

When visiting a fortress, it is politic to call on the Commandant to ask permission to see the place, but it is not necessary as there are no guards or guns or modern works.

Some of the sanitary arrangements are very primitive, especially in the fortresses, where there are no drains; but everywhere there are clean sheets and electric light and bells. The Palace Hotel at Luso-Bussaco is charmingly situated, close to the scene of Crawford's charge at the head of the Light Division, and is most comfortable and up-to-date. Breakfast everywhere is 12 to 1, and dinner in Portugal at 7 p.m., and in Spain at 8 p.m. Everyone seems to expect tips, but that peculiarity is not confined to Spain and Portugal.

Allowing four days for the sea journey to and from Lisbon, the best way to spend the remaining time by tours would be as follows:—

First tour—Lisbon, depart 7.30 a.m.; Torres Vedras, arrive 9.17 a.m.

The Hotel Natividade is close to the station. The old lines are quite easy to distinguish, with forts on the commanding heights and the ground scarped in front. All lines are traced so as to bring flanking fire across the front of works on their right or left.

A carriage can be procured here to drive to Vimeiro (8 miles). The course of the fight of 21st August, 1808, can readily be followed once Vimeiro, in the defence of which the 50th Regiment earned such a high enconium for steadiness, is located. The ravine in front of the left of the British position, where Brennier was taken prisoner whilst trying to turn the British left, serves as an object lesson as to what effect even small obstacles may have on the course of an action.

Second day.—Return to Lisbon after staying one night.

Torres Vedras, depart 3.37 p.m.; Lisbon arrive, 6.53 p.m.

Third day.—Lisbon, depart 10.25 a.m.; Alhandra, arrive 11.21 a.m.

On walking up to the monument on the nearest spur, the right flank of the 1st and 2nd lines, which met at Alhandra, can be plainly made out,

and the day is spent in inspecting the various works: Alhandra depart 6.16 p.m.; Lisbon arriving 7.18 p.m.

The 3rd lines were round Fort S. Julian, to which trains go every half hour from another station, the Caes de Sodre, close to the fish market, which is well worth a visit. The station for Fort St. Julian is St. Amaro. There are frequent trains to Cintra from Rocio Station, which adjoins the Avenida Palace Hotel.

The Cathedral and the church of S. Vicente, where the bodies of the Sovereigns of Portugal are embalmed, including those of the late King and Crown Prince, which can be seen through glass, can both be visited by the Graço tram, and the tower and cloisters of Belem can be reached by the Belem tram. Both trams pass close in front of the hotel.

Second tour.—Ask the hotel porter to write to "Il Proprietario, Hotel del Commercio, Salamanca, España," to reserve rooms and send to meet train first evening; and the same to "Señor A. Salgado, Fonde Salgado, Ciudad Rodrigo, España," for the third afternoon.

First day—Lisbon, depart 9.45 a.m.; Salamanca, arrive 10.50 p.m.

The train passes along the route of Massena's retreat, covered by Ney's rear guard, in 1811: Pombal on 10th March; Redinha, 12th; Condeixa, 13th; Celorico, 21st; and Guarda, 28th. They can all be seen in daylight.

Second day.—*Salamanca.* Hire a conveyance and drive across the bridge over the Tormes, and take the left-hand road to the Arapiles. This road passes behind the British first position on 22nd July, 1812, the right of which ended just short of the Arapiles. From the top of the British Arapiles the whole course of the battle can be seen, except the line of the French retreat towards Alba de Tormes, which is best seen from the French Arapiles. Drive back through the village of Arapiles and over the line of Pakenham's attack on the head of Thomiere's Brigade. What a splendid effort Clausel must have made to retrieve the situation after Marmont was wounded.

On arrival at the bridge on the return journey, get out and look at the ruins of the fortifications of the convents which barred the British advance in May, 1812, and then walk out and see the positions taken up to defend Salamanca from the north.

Third day.—Salamanca, depart 11.25 a.m.; Ciudad Rodrigo, arrive 1.22 p.m.

Ciudad Rodrigo.—The main breach is still bare, as the masonry was never replaced. It is in the north-west corner, where stands the Cathedral, still bearing marks of the battering received in January, 1812. There is also in this corner a monument to General Herrasti, the brave defender against the French in June and July, 1810.

There is no difficulty in recognising the Great and Little Teson from the retrenchment on the rampart behind the main breach; but the Convent of Santa Cruz no longer exists, and that of S. Francisco, whence the Light Division started for the assault of the Salamanca gate and the lesser breach, in which Crawford was killed, is in ruins.

Marmont had left too small a garrison, and made no real effort to relieve the place, little thinking the ordinary rules of war would be disregarded. The result was that all his battering train, 150 guns and 1,700 good troops were lost to him for the remainder of the campaign. A Spanish

engineer officer, by name Captain Unciti, told me he had been to considerable pains to try and make out the exact positions of the parallels and approaches, and that, considering the fact that there was no corps of engineers then, and the tools supplied were indifferent, the work done appears to have been up to a high standard of merit.

The old gentleman who owns the inn at Ciudad Rodrigo, Señor Salgado, is a typical courteous Spaniard, but he doesn't know a word of any language but his own. Captain Ricardo Unciti, however, who is writing a history of the siege, lives in Ciudad Rodrigo, and knows French fairly well. He told me it would always be a pleasure to assist any British officers who wished to see Ciudad and its neighbourhood, and he is a friend of Señor Salgado.

Fourth day.—Ciudad Rodrigo, depart 8.10 a.m.; Fuentes d'Oñoro, arrive 9.24 a.m.

Fuentes d'Oñoro.—A good view of the lie of the ground between the Duas Casas and Tormes streams can be obtained from the hill Nava d'Aver, occupied by Julian Sanchez and his guerillas at the beginning of the battle of 5th May, 1811. The danger to which Wellington was exposed when the hill was abandoned must have been great. The hill overlooks the scene of Norman Ramsay's dash for freedom with his Horse Artillery Battery when the 7th Division was so hardly pressed by Montbrun in the low, swampy ground near the source of the Duas Casas. Then walk back to Fuentes Station by Poço Velho and Villar Formoso. Villar Formoso is the Portuguese frontier station, Fuentes the Spanish, and they are half a mile apart. The international agent at Fuentes Station is very helpful.

Fuentes d'Oñoro, depart 5.20 p.m.; Ciudad Rodrigo, arrive 6.25 p.m.

Fifth day.—Ciudad Rodrigo, depart 8.10 a.m.; Villar Formoso, arrive 9.27 a.m.

Hire a carriage to drive to Almeida (9 miles), see the fortress (a model of what a fortress should have been 100 years ago), and Crawford's position on the Coa, when he was supposed to have imperilled the existence of the Light Division by refusing to retire when Massena advanced to invest Almeida after capturing Ciudad Rodrigo on the 11th July, 1811. Crawford's left rested on a rocky height about 800 yards from Almeida. Drive back and walk from Villar Formoso to

Fuentes d'Oñoro, depart 5.20 p.m.; Ciudad Rodrigo, arrive 6.25 p.m.

Sixth day.—Hire a carriage so as to leave at 8.30 a.m., and drive to El Bodon, and see the ground over which the 11th (The Cherubims) repeatedly charged about 4,000 of Montbrun's cavalry as they reached the top of the slope with blown horses, also the line of retreat of the square composed of the 5th and 77th, after they had charged the French cavalry with the bayonet.

Seventh day.—Ciudad Rodrigo, depart 1.22 p.m.; Luso-Bussaco, arrive 6.31 p.m.

Write to the Palace Hotel, Luso-Bussaco, a day or two before, and ask the manager to send the motor for you to the railway station.

Eighth day.—Start from the hotel at 8 a.m. and walk to the chapel, just outside the park wall, and see the plan of the battle-field; then climb up the hill, leaving the Anglo-Lusitanian monument on your right, and follow the Bussaco Park wall to the top of the hill—a climb of 500

feet — General Spencer's position. Walk southwards along the top of the Sierra, and return as far as the lowest part of the range, where Reyniers' attack was made on the north side of the trail from S. Antonio, when first the 88th and 45th, and then the 9th, made such gallant charges against the heroes of Austerlitz.

From the spot where Wellington placed Thompson's guns to rake Merle's Brigade, which was afterwards reached by Foy's Brigade, there is a good path almost on the level all the way back to the Lusitanian monument, which saves a stiff climb and brings you out close to Crawford's right, where Marchand's Division attacked; and a little further on, round the spur, is the crest from which the 43rd and 82nd launched their famous charge on Ney's right division under Lorsin.

The gradient of the road up the spur has been altered, and it takes some little time to fix on the exact spot, but the deep ravine which separated the attacks of Ney's two divisions serves as a guide.

This is rather a long day if you go far enough in the morning to overlook the Mondego and the Murcella position on the left bank of the Mondego; but the hotel is on the spur defended by the Light Division, so once back there your day is ended.

Ninth day.—Leave the Palace Hotel in a motor at 9 a.m. and motor to Pampilhosa, depart 9.53 a.m.; Oporto, arrive 1.51 p.m. Write on to the Hotel d'Oporto as usual.

Cross the footbridge and go up to the Convent on the height of Serra, where Wellington stood on the 12th May, 1809; you can see everything from there.

Tenth day.—Oporto, depart 5 p.m.; Lisbon, arrive 10.50 p.m.

Third tour.—Lisbon, depart 10.25 a.m. (change at Torre Das Vargens 4.2 p.m.); Badajos, arrive 7.25 p.m.

Get the hall porter at the Avenida to write to Señor A. Vallejo de Mercado, Hotel de Paris, Badajos, as usual. There is an intelligent waiter there who understands a few words of French.

Badajos.—Second day.—First cross the Agueda by the bridge and climb up to Fort Christoval, as from there you command a good general view. Then return and walk round the ramparts and castle, and finally go out to the Picurina by the Trinidad Gate and St. Roque, and work your way to the great breach in the Trinidad bastion. There is an inscription on the spot where the great breach was, cut into the stone (1812), with cannon balls let in round it.

According to Napier and Maxwell, the Santa Maria and Trinidad bastions are next to one another, and this makes the narrative rather hard to follow, as according to the Spanish plans of 1811 and 1812, the St. Roque bastion is between the Santa Maria and Trinidad bastions, which appears to show there was some mistake in the orders which led to the confusion in the assault of the Light Division under General Barnard on the 6th January, 1812. Whether there was any misunderstanding or not, a view of the position of the breach gives one food for thought as to whether European soldiers of to-day have the magnificent fighting qualities displayed by both sides on that memorable occasion.

Albuera.—Third day.—Drive to Albuera (14 miles) and put up there. After seeing the bridge where Godinot's Brigade made the false attack, take the new road to Valverde, which follows the valley of the Feria stream,

having on your left (and on the other side of the stream) the wooded height, behind which Soult massed his troops to turn Beresford's right. In about two miles you reach the undulations in the ground whence the Fusilier Brigade (7th and 23rd) drove the victorious French of Gerard's Corps and Werle's Brigade at the point of the bayonet on the 15th May, 1811. Next cross the valley of the Arroya val de Seville, and see where Lumley drove off the disorganised French cavalry.

Return to Albuera by the old Valverde road, which is the one shown in Napier's sketch of the field of battle.

Badajos, depart 6.5 p.m.; Elvas, arrive 7 p.m. Write to the Central Hotel, Elvas, as usual.

Elvas.—Fourth day.—See Elvas and the fortress. Elvas, depart 7 p.m.

Lisbon.—Fifth day.—Arrive 6.25 a.m.

Fourth tour.—Lisbon, depart (Mondays, Wednesdays, and Saturdays only), 7.25 p.m.; second day, Talavera, arrive 8.26 a.m.

En route you pass Abrantes, Alcantara, and Almaraz, the scene of General Hill's great exploit in May, 1812, in order to destroy the one remaining bridge by which the French armies could communicate.

The Spanish right (at Talavera) rested on the town, 28th July, 1809, and to the British left, where the fighting took place, is a short, easy walk. Return same evening to Lisbon, 11.56 p.m.

Should time be available, Talavera, depart 4.38 p.m.; Madrid, arrive 8.37 p.m., visiting the scenes of the battles of 1813 and 1814, Burgos, Vittoria, St. Sebastian, Pyrenees, Nive, Nivelles, Bayonne, and Bordeaux, on the way home by rail.

Thus, if a month can be spared in the Peninsula, almost the whole of the battle-fields can be visited. If, however, only a month altogether is available, the Talavera and northern ground must be omitted, as between arriving at Lisbon on the Monday morning and leaving on the Wednesday fortnight about 2 p.m., only fifteen clear days can be counted on. In order to put in those fifteen days to the best advantage, I would suggest :—

1. Seeing Vimeiro the same day as Torres Vedras.
2. Leaving out Elvas from the Badajos tour.
3. Driving to Almeida the same day as Fuentes d'Oñoro.

The expenses would come to under £40 :—

	£	s.
Journey, London and Southampton and back ...	1	3
Return ticket to Lisbon and back	12	0
Hotel and carriage expenses, at £1 per day	16	0
Tips and sundries ... ... (about)	8	0
Total	37	3

Should any officer wish for further information it will be a very great pleasure to give it if he will write to me at any time to Sprotborough Hall, Doncaster.

A. Bewicke-Copley,

Brig.-General.

NAVAL AND MILITARY CALENDAR.

SEPTEMBER, 1909.

6th (M.) H.M.S. *Flora* paid off at Colombo.
" " H.M.S. *Cambrian* paid off at Colombo.
7th (T.) H.M.S. *Flora* recommissioned at Colombo.
" " H.M.S. *Cambrian* recommissioned at Colombo.
11th (Sat.) Presentation of Colours to the 4th Border Regiment at Lowther Castle by Lord and Lady Lonsdale. Bicentenary of the Battle of Malplaquet (11th September, 1709).
13th (M.) 150th Anniversary of the Capture of Quebec and death of General Wolfe.
15th (W.) Argyll and Sutherland Highlanders embarked at Southampton for Malta.
17th (F.) Attempt to salve Submarine "C 11" abandoned.
18th (Sat.) Presentation of Colours to the 6th Seaforth Highlanders at Elgin by the Duke of Richmond and Gordon.
24th (F.) 1st Inniskilling Fusiliers left Malta for Tientsin in transport *Soudan*.
25th (Sat.) Launch of first-class battle-ship *Helgoland* from the Howaldt Yard, Kiel, for German Navy.
" " French military Airship *Rèpublique* collapsed through damage caused by breaking of propeller blade, and fell to earth from a height of 400 feet, her crew of four being instantly killed.
27th (M.) Spanish troops captured Zeluan, Riff stronghold in Muluya Valley.
29th (W.) 8th Hussars left Southampton for Lucknow per transport *Dongola*.
" " Spanish troops captured Mount Gurugu, the Moors' strongest position.
30th (Th.) Launch of first-class battle-ship *Neptune* at Portsmouth.
" " Launch of second-class cruiser *Glasgow* from the Fairfield Shipbuilding and Engineering Yard at Glasgow.
" " Launch of first-class battle-ship *Ostfriesland* from the Imperial Dockyard, Wilhelmshaven, for German Navy.

FOREIGN PERIODICALS.

NAVAL.

ARGENTINE REPUBLIC.—*Boletín del Centro Naval.* Buenos Aires: May and June, 1909.—"The First Battle Squadron." "The Italian Combined Naval and Military Manœuvres." "The Argentine Navy League."

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens.* No. 10. Pola: October, 1909.—"Deep Sea Diving." "Progress in Artillery Matters, 1908-09." "The Statement of the French Minister of Marine on the Supplementary Credits for 1909." "German Naval Estimates for 1909." "The Behaviour of the Various Types of Boilers

during the Cruise Round the World of the U.S. Fleet." "The French Submarine Salvage-Ship *Vulcain*."

BRAZIL.—*Revista Maritima Brazileira.* Rio de Janeiro: July, 1909.—"The Mercantile Marine." "The Japanese Navy." "Practical School of Artillery: No. 2." "Ambulances."

CHILI.—*Revista de Marina.* Valparaiso: June, 1909.—"Reform in the Matter of Projectiles and Coast Artillery" (*concluded*). "Radio-Telegraphy: Its Present State and Progress." "A Necessity." "Cordite: The Influence of Temperature on its Ballistic Qualities; the Necessity of Making Practical Experiments." "Improvements in Torpedoes." "Political and Military Study of Japan" (*continued*).

FRANCE.—*Revue Maritime.* Paris: July, 1909.—"Marine Engines." "The Dunkirk Corsairs under Louis XIV."

La Marine Française. Paris: September, 1909.—"The Enquiry into the State of the Navy" (*continued*). "What is Naval Power?" "Brest-Transatlantic." "Our Naval Arsenals." "The Food of the Seaman." "Naval Megalomania." "Veteran Seamen."

La Vie Maritime. Paris: 10th September, 1909.—"The New Organisation of the Squadrons and the Reforms." "Old Paths." "Munitions and the Firing Schools." "A New Boiler Commission." "The *Rurik* and the *Renan*." "Firing Experiments against the *Iéna* and the *Terrible*" "The Guns of the *Jules Michelet*." 25th September.—"The Raising of Pay." "Wireless Telegraphy." "Our Submarines." "New Lines for the Hulls of Ships to Ensure High Speeds." "The Firing at the *Iéna*."

Le Yacht. Paris: 4th September, 1909.—"The Gunnery Division." "Yachting Notes." "The Danish Submersible *Dykkeren*." "Physical Exercises in the Navy." 11th September.—"The Torpedo Divisions: The Flotillas." "Yachting Notes." "Naval Reforms." "The Incidents at Marseilles." "The New Destroyer *Chasseur*." 18th September.—"The Crews of the Fleet." "Yachting Notes." "The Central Torpedo Department." 25th September.—"The Genesis of Naval *Matériel*." "Yachting Notes." "The English Factory-Ship *Cyclops*." "The Prize Competition of the Flotillas."

Le Moniteur de la Flotte. Paris: 4th September, 1909.—"The Speech of the Minister of Marine at La Rochelle." "The Flotillas: The New Fleet." 11th September.—"The Gunners-Fusiliers." "The Inspector-Generals." "Automatic Torpedoes." "Triple Turrets." 18th September.—"The Practice of Navigation: Approaching Cruises of Training Ships." "The Grand Councils." "The Navy in Parliament." "The Reorganisation of the Administrative and Technical *Personnel*." 25th September.—"The Question of Premiums." "The Consultative Organs of the Navy." "The Central Administration." "The Navy in Parliament." "The Torpedo Schools."

GERMANY.—*Marine Rundschau.* Berlin: October, 1909.—"Trans-Continental Railways and Trans-Continental Railway Projects." "Speculations on the Possibility of Paying Airship Lines of Communication, with Regard to the Special Practicability of an Airship Traffic over the Atlantic

from the Aerological and Seamanship Standpoint." "The English Naval Manœuvres, June-July, 1909." "Tsushima in French Eyes." "The Importance of the Sleeping Sickness for Our Colonies." "China, Japan, Korea and Manchuria."

ITALY.—*Rivista Marittima.* Rome: July-August, 1909.—"Battleships." "The Action of the Fleet in 1859." "Une Nouvelle Droite de Hauteur." "Hydraulic or Electrical Gun Installations." "Internal Ballistics."

PORTUGAL.—*Revista Portugueza, Colonial e Maritima.* Lisbon: August, 1909.—Has not been received.

Annaes do Club Militar Naval. Lisbon: August, 1909.—"Some Considerations on the Report of the Enquiry into the State of the French Navy, with Reference to the B. Powder." "Instruction and Education of the Junior *Personnel* of the Fleet." "Fire Direction." "The War in Guinea."

SPAIN.—*Revista General de Marina.* Madrid: September, 1909.—"The London Naval Conference." "The Portuguese Navy." "The Question of Cruisers." "The Life of Heavy Guns." "Notes on Coast Defence in Germany."

UNITED STATES.—*United States Naval Institute Proceedings.* No. 3. Annapolis: September, 1909.—"Another View of Alma Mater." "The Monroe Doctrine: Its Meaning and Application at the Present Day." "The Major Elements of War Efficiency." "The Cruise of the *Clarence-Tacony-Archer.*" "American Admirals in the British Navy." "The Nitrogen Question from the Military Standpoint." "Some Notes on Parsons Turbine Construction." "The Selection of the West Indian Naval Base." "On the Approximate *Formulæ* for Areas and Volumes, and their Comparative Accuracy." "Voice Pipes." "An Enumeration and Short Account of Names of Men-of-war during the Early United States Naval History." "Main Engine Repairs under way." "A Study of Naval Strategy."

MILITARY.

AUSTRIA-HUNGARY.—*Danzer's Armee-Zeitung.* Vienna: 2nd September, 1909.—"Aims and Methods of a Great Balkan Policy." "Studies for a New Statute." "Crete." "Lieut.-General Graf Jellachich." "The Taking Over of Command." "Abstract of Foreign Manœuvres, 1909." 16th September.—"Thirty Years of Austro-German Alliance." "The Constitution for Bosnia." "The Kaiser-Manœuvres in Moravia." 23rd September.—"The Development of the Empire's Crisis." "The Kaiser-Manœuvres in Moravia" (*continued*). 30th September. — "The Kaiser-Manœuvres in Moravia" (*concluded*).

Streffleurs Militärische Zeitschrift. Vienna: September, 1909.—"The First Field-Manœuvres of the Emperor Joseph II. in Bohemia, 1756." "Heavy Batteries and the Captive Balloon." "On the Transport of Machine Guns in Heavy Snow." "A Foundation for Developing Power of Judgment and Capacity for Coming to a Determination in Soldiers." "The Misuse of Alcohol: Its Effects and its Combating in Peace and War."

Kavalleristiche Monatshefte. Vienna: September, 1909.—"The Cavalry at Aspern and Wagram." "Letters on the "German Cavalry

Regulations.'" "A French Cavalry General." "Battle Scouting." "Winter Work." "Machine Gun Squadrons." "A Proposal for Combating Horse Murrain." "Tactical Problems for Cavalry Officers."

BELGIUM.—*Bulletin de la Presse et de la Bibliographie Militaires.* Brussels: 15th August, 1909.—"Manœuvre Regulations for the German Army (22nd March, 1908)" (*continued*). "The Cavalry Divisions at the Imperial German Manœuvres, 1908." "Reorganisation of the French Artillery." 31st August.—"Manœuvre Regulations for the German Army (22nd March, 1908)" (*continued*). "Reorganisation of the French Artillery" (*continued*). "The Cavalry Divisions at the Imperial German Manœuvres, 1908" (*continued*).

FRANCE.—*Journal des Sciences Militaires.* Paris: 1st September, 1909.—"Initiative among Soldiers" (*continued*). "Critical Study of the Bill Relating to the *Cadres*." "Studies on the Sanitary Service in the Field" (*continued*.) "Advantages and Inconveniences of the New Gymnastics." "Automobilism from the Military Point of View" (*continued*). "The Battle of Iéna." 15th September.—"Aeroplanes and Dirigibles." "War and Compulsory Service." "The Initiative among Soldiers" (*concluded*). "Promotion of Officers." "Advantages and Inconveniences of the New Gymnastics" (*continued*). "Organisation and *Encadrement* of Infantry." "Automobilism from the Military Point of View" (*concluded*).

Revue d'Infanterie. Paris: August, 1909.—"Infantry Combat: The Moral Factor." "New Firing Regulations for the Russian Army." "The New Manœuvre Regulations of the Spanish Infantry."

Revue de Cavalerie. Paris: August, 1909.—"General de Gallifet, Grand Master of the French Cavalry." "Our Cavalry in the Next War (General von Bernhardi)." "A Cavalryman at the Army Manœuvres, 1908." "Seydlitz" (*continued*). "Contradictions." "The Cavalry Manœuvres, 1909."

Revue d'Artillerie. Paris: July, 1909.—"The Flight of Birds, Form of the Wings, and Aeroplanes." "English Opinions on the Communications between the Different Arms." "The Practice of Covered or Semi-Covered Artillery Positions." "Photographic Observation Service from Balloons."

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Le Spectateur Militaire. Paris: 1st September, 1909.—"Souvenirs of an Officer of the 13th of the Line" (*concluded*). "Principles which should Serve as a Base for the Organisation Laws" (*continued*). "Manœuvring in Woody Country" (*continued*). "The Letters of Major Kretschman" (*continued*). 15th September.—"Strategical Considerations on the Italian Campaign, 1800." "Principles which should Serve as a Base for the Organisation Laws" (*continued*). "Manœuvring in Woody Country" (*continued*). "Letters of Major Kretschman" (*continued*).

Revue d'Histoire. Paris: September, 1909.—"A Guerilla Leader in 1800." "The Campaign of 1813: The Preliminaries." "The Causes of

the Austrian Defeat in 1866" (*concluded*). "The Mitrailleuse in 1870" (*continued*). "The War of 1870-71: The National Defence in the Provinces" (*continued*). "Unpublished Letters of Napoleon I." (*continued*).

Revue Militaire des Armées Etrangères. Paris: September, 1909.—"The U.S. Army in 1909." "The Budget of the German Army for 1909" (*continued*). "The New Manœuvre Regulations for the German Cavalry" (*concluded*).

GERMANY.—*Militär-Wochenblatt.* Berlin: 2nd September, 1909.—"To the Umpire, M.O., 89-106." "The Fight for Universal Service in England." "A *Landwehr* Exercise in Italy." 4th September.—"The Defence of the Railway Redoubts of Hantschenpu at the Battle of Mukden" (*continued*). "To the Umpire, M.O., 89-106" (*continued*). "Training of Reserve Officers for Service with Signal Detachments." "The French Field Gun in the Night Action of Bon-Denib (1st September, 1908." 7th September.—"Importance of the Somme for the Germans in the Time between the Battles on the Hallue and at St. Quentin." "Militia-Cavalry and Two Years' Service." "To the Umpire, M.O., 89-106" (*concluded*). "Minister of War Haldane on the Position of Military Airships in England." 9th September.—"The Battle in the Teutoburg Wood, 9th-11th September, in the Year 9." "The Revision of the Officers' Grade in Turkey." "Titles in the Turkish Army and the Different Military Ranks." 11th September.—"The Battle of Malplaquet, 11th September, 1709." "Stabbing or Cutting Weapons." "The New Roumanian Infantry Drill Regulations." "The Independence of the Soldier." 14th September.—"On the History of the Prussian Artillery." "The Battle of Malplaquet" (*concluded*). "The Position of Retired Officers in Italy." 16th September.—"Two Hundred and Fifty Years Ago." "The Spanish War in Morocco" (*continued*). "The Danish National Defence Questions." "A Letter of Pertev Pasha." 18th September.—"Kriegerisches und Friedliches aus dem Feldzügen con, 1864, 1866, 1870-71, by H. v. Müller." "The British Empire Defence Conference." "The Netherlands Army." Extra Edition.—"The British Empire Defence Conference" (*concluded*). "The Chilian Army." 21st September.—"What the Fighting round Port Arthur has Taught us in Regard to Coast Fortifications?" "The Bulgarian Army." 23rd September.—"What the Fighting round Port Arthur has Taught us in Regard to Coast Fortifications?" (*continued*). "The Independence of the Soldier." "Wright's Flight." 25th September.—"Napoleon I.'s Means of Communication" (*continued*). "What the Fighting round Port Arthur has Taught us in Regard to Coast Fortifications?" (*continued*). "Firing Competitions and the Army." 28th September.—"The Commanding Generals of the German Army from 1889 to 1909" (*continued*). "Napoleon I.'s Means of Communication" (*continued*). "The French Field Sanitary Service." 30th September.—"The Army Leading of Napoleon in its Importance for Our Own Time." "Casualty Flags." "New Organisation of the Russian General Staff College."

Artilleristiche Monatshefte. Berlin: September, 1909.—"The Report of the Military Commission on the Reorganisation of the French Artillery." "Fire Direction for the Field Artillery." "The New Austro-Hungarian Field Artillery Organisation and Regulation." "Practice against Airships." "The Field Artillery Schools." "Cover for the Field Artillery according to the Russian Field Fortification Regulations."

Jahrbücher für die Deutsche Armee und Marine. Berlin: September, 1909.—"A French Comparison between the Kaiser Manœuvres and the Manœuvres of the Centre, 1908." "Not Fire Superiority but Fire Attack." "A Decision of the Imperial High Court on the Military Pension Law." "The Construction of French Fortifications during the Last Ten Years." "The Development of the Battleship." "The Education of the Soldier."

ITALY.—*Rivista di Artiglieria e Genio.* Rome: June, 1909.—"The Siege Goniometer and Dial Sight." "Notes on the Structure and Thickness of Bomb-Proof Cover Under Fire." "Notes on Siege and Heavy Field Artillery of Various Armies." "A Turkish Fortress: St. John of Acre." "On the Production of Steel with the Electric Furnace on the *Stassano* System." "On the Necessity of Reinstituting Training in Field-works in the Infantry."

July-August, 1909.—"The Jubilee of the War of Liberation at the School of Instruction of Artillery and Engineers." "General Eusebio Bava." "Practical Calculation of Cast Iron Water Conduits." "Ever Progress." "A Further Note about Switching Fire on Concealed Targets." "A New Type of Observation Wagon." "The Brinell Apparatus and its Applications." "For an Idea." "Road Trains with Exact Locking Wagons."

Rivista Militare Italiana. Rome: 16th August, 1909.—"Kassala." "Old and New Conceptions of Authority." "The Italian Army at Custozza (1866), Judged by an Austrian General." "African Matters." "The Tuscan Troops in 1859." "The Relation between Geography and History." "The Battle of St. Euphemia and the Calabrian Insurrection against the French." "National Awakening and Soldier Heroes." "Some Notes of Archduke Albert on the Battle of Solferino." "Austrian Economies and Italian Extravagance." "Statistical Notes on the Levy of the Men Born in 1887."

Rome: 16th September, 1909.—"The War Office and the Central Organs of the Army" (*concluded*). "The Graphic Solution of Problems Concerning March Orders." "The Tuscan Troops in 1859" (*concluded*). "The Battle of St. Euphemia and the Calabrian Insurrection against the French" (*concluded*). "Some Military Geographic Notes on the Territory Situated between Massowah, Asmara, Aksuma, and Adigrat." "Tripolitana." "Notes and Remarks on the Campaign of 1859." "The Fort of Fuentes." "Statistical Notes on the Levy of the Men Born in 1887."

SPAIN.—*Revista Técnica de Infantería y Caballería.* Madrid: 1st August, 1909.—"Military Instruction of the Troops." "Our War in Africa, Judged by a German General." "Philosophical Reflections about War and Soldiers" (*continued*). "Examination of the French Frontier" (*continued*). "The New Tactics" (*continued*). "Report on the Musketry Course by Infantry First-Lieutenants at the Central Musketry School" (*continued*). "Educators of Armies: In Germany." 15th August.—"Our War in Africa, Judged by a German General" (*concluded*). "Philosophical Reflections about War and Soldiers" (*concluded*). "Examination of the French Frontier" (*concluded*). "Educators of Armies: In France" (*continued*). "The New Tactics" (*concluded*). "Report on the Musketry

Course by Infantry First-Lieutenants at the Central Musketry School" (*continued*). "A Grand Diplomatic Soldier."

Revista Científico- Militar y Bibliotéca Militar. Barcelona: 1st September, 1909.—"The Operations at Melilla." "Regulations for the War in North Africa." "Infantry Attack Formations from the Artillery Point of View" (*concluded*). "Pay in the German Army." "Rifle Firing at Balloons." 25th September.—"The Operations from the 1st to the 15th September." "Hand Grenades." "Spain in Morocco."

SWITZERLAND.—*Revue Militaire Suisse.* Lausanne: September, 1909.—"The Swiss in Italy" (*continued*). "The Light Field-Howitzer and Flat Trajectory Firing." "Mobile Field Kitchens." "The Manœuvre and Battle Regulations of the Roumanian Infantry." "Sheer Line Bridges."

NOTICES OF BOOKS.

A Vindication of Warren Hastings. By G. W. HASTINGS. London: Henry Frowde. 1909.

It is undeniable that in spite of all the efforts of the admirers of Warren Hastings to clear his memory from the aspersions cast upon him during his state trial by Burke, Francis, and Sheridan, the reputation of Hastings still remains unjustly tarnished. Burke and Francis are now but shadows, and Sheridan is nearly forgotten, or remembered chiefly as the brilliant dramatist of a century ago, but their slanders on Hastings, though refuted almost as soon as uttered, having unhappily been endorsed and repeated by Mill, in his history of India, and by Lord Macaulay in the famous—we had nearly written infamous—Historical Essay, have passed into the educational *matériel* of the nation.

It is therefore unfortunately the case that, even to-day, grown men and women, as well as youths and maidens, still believe the old untruths; still believe that Hastings, who died poor, wrung a great fortune from the oppressed natives of India; from those natives who, in point of fact, hailed him, in the day of his adversity, no less than in the hey-day of his power, as their best friend, their wisest adviser, and their most benevolent ruler. Young and old still believe the grotesque falsehoods of Sheridan, whose ignorance and credulity afford him some poor excuse, and their belief is, we think, almost entirely attributable to the reiteration of the charges of the prosecutors of Hastings in the magic pages of Macaulay, who certainly cannot stand excused, either by ignorance of Indian affairs or by any inability to measure plain evidence.

We need not here pause to enquire why it was that Macaulay thus deliberately perpetuated a great wrong. Suffice it to say that, as Mr. G. W. Hastings truly states, not only Englishmen, but Americans, Japanese, and, more mischievous still, Indian students of our history firmly believe to-day, on Macaulay's authority, that Warren Hastings committed great crimes against the people entrusted to his charge, and that he only escaped conviction and punishment because his judges, the Peers of Great Britain, had become weary of his prolonged trial. Yet Macaulay, who supported

this perversion of history, is said, by the author of the book under review, to have expressed in a letter to Jeffrey, the editor, through whose hands the essay on Warren Hastings passed into print, the opinion that Hastings was one of the greatest, and possibly even the greatest Englishman of the eighteenth century. Such a contradiction of language is inexplicable in a writer who lays claim to the title and character of historian.

As regards Mr. G. W. Hastings' contribution to the literature associated with the name of his famous kinsman, a few extracts will, we think, best explain the intention and character of the book.

It is largely a compilation, principally founded on the two volumes of *State Papers*, edited by Mr. G. E. Forrest for the Government of India, and has been written with the object of presenting in a clear and concise form the evidence adduced by Mr. Forrest in refutation of the six principal charges brought against Hastings at his trial by the Peers.

We will take as a specimen the first charge dealt with, that regarding the Rohilla War, perhaps the darkest crime imputed to Hastings; and we will follow Macaulay's indictment by the rebutting evidence now adduced and by the author's comments.

Referring to the condition of Rohilkhand at the end of the war, Macaulay writes as follows:—"The whole country was in a blaze. More than a hundred thousand people fled from their homes to pestilential jungles, preferring famine and fever to the tyranny of him to whom an English and a Christian Government had for shameful lucre sold their substance and their blood, and the honour of their wives and daughters." Then follows Mr. Forrest's verdict on this lurid passage, worthy rather of Mr. Hall Caine than of Macaulay.

"A close and minute study of the evidence demonstrates that a certain number of the villages were burned and that the prisoners were ill-subsisted. A hundred thousand people did not fly to pestilential jungles, but about seventeen hundred or eighteen hundred Rohillas, with their families, were expelled from Rohilkhand, and Hindu inhabitants, amounting to about seven hundred thousand, remained in possession of their patrimonial acres and were seen cultivating their fields in peace."

Who can wonder at Mr. G. W. Hastings' indignant comment on Macaulay's travesty of history. "This rhetorical invective," he writes, "is the more inexcusable because the evidence correcting it has always been on record in the proceedings of the Secret Committee of the Indian Council, and Macaulay, when for five years a member of that Council, had ample opportunities to consult the authorities, and ascertain the truth for himself. He chose instead to rely on the mistakes and malignities of Francis, Burke, and Mill, without verification, and to indite thereupon, with all the wealth of his vocabulary, a hideous slander on the great founder of British India."

To this Mr. Hastings adds the testimony of Sir John Strachey, a distinguished Indian administrator, speaking from his own experience:—

"Several years of my Indian service," writes Sir John in his "Hastings and the Rohilla War," "were passed in the province of Rohilkhand. When I was first sent there old men were still living who remembered having heard in their childhood the story of Hafiz Rahmat, the great Rohilla Chief, of his defeat by the English, and his death. I went to Rohilkhand without a doubt of the truth of the terrible story told by Burke and Mill,

and by Lord Macaulay in his famous essay, but I soon changed my opinion. I found myself in the midst of a population by which the history of these times had not been forgotten, and of which an important and numerous section consisted of Rohillas, the children and grandchildren of the men whose race was supposed to have been almost exterminated. I was in frequent communication with a Rohilla Prince, who ruled over a considerable territory which his ancestor owed to Warren Hastings, and which had been in the possession of his family ever since. No one had ever heard of the atrocities which to this day fill Englishmen with shame. Later in life I was able to undertake an examination of the original authorities on the Rohilla war, and I can hardly express in moderate language my indignation at the misrepresentations, the suppression of truth, the garbling of documents, of which I found that Mill had been guilty. The English army was not hired out by Hastings for the destruction of the Rohillas; the Rohillas, described by Burke as belonging to 'the bravest, the most honourable and generous nation on earth,' were no nation at all, but a comparatively small body of cruel and rapacious Afghan adventurers, who had imposed their foreign rule on an unwilling Hindu population, and the story of their destruction is fictitious."

The evidence of Sir John Strachey is conclusive, and fully justifies the indignation expressed by Mr. G. W. Hastings against Macaulay. It must be borne in mind, too, that the slanders on Warren Hastings not only wrong his illustrious memory, but are freely used to-day by those who desire to stir up in India hatred against the English rulers of that vast territory. We therefore commend Mr. G. W. Hastings' interesting and valuable book to the attention of all whose duty it is to supervise the historical education of the rising generation of England and India. They will, we trust, after a study of its pages, agree with us in the opinion that Macaulay's essay on Warren Hastings should no longer be placed in the hands of their young, impressionable, and uninformed pupils.

PRINCIPAL ADDITIONS TO LIBRARY DURING SEPTEMBER, 1909.

Trumpets and Bugle Sounds for the Army. Official. Crown 8vo. 9d. (Presented.) (Harrison & Sons.) London, 1909.

Arctic Expeditions from British and Foreign Shores from the Earliest Times to the Expedition of 1875-76. By D. MURRAY SMITH. 4to. 40s. (M'Gready, Thomson & Niven.) Glasgow, 1877.

The Annals of the Twelfth East Suffolk Regiment. By Captain C. H. GARDINER, 12th Regiment. 8vo. (Presented.) (Free Press Works.) Bury St. Edmunds, 1908.

The Russo-Japanese War—The Battle of Liao-Yau. Prepared in the Historical Section of the German General Staff. Authorised translation by KARL VON DONAT. 8vo. 10s. 6d. (Presented.) (Hugh Rees, Ltd. London, 1909.

The Russo-Japanese War on Land, 1904-1905, *up to the Battle of Liao-Yang*. By J. H. ANDERSON. 8vo. 3s. 6d. (Presented.) (Hugh Rees, Ltd.) London, 1909.

Garibaldi and the Thousand. By G. M. TREVELYAN. 8vo. 7s. 6d. (Presented.) London, 1909.

Die Küstenbefestigungen der ausser-deutschen Seemächte. By Captain W. STAVENHAGEN. 8vo. 3s. (Presented.) (E. S. Mittler.) Berlin, 1909.

The Sovereignty of Malta and the Nature of its Title. With Notes and Appendices by ANGUS W. BARTOLO. 8vo (Presented.) (*Daily Malta Chronicle* Office.) Malta, 1909.

Military Map Reading. By Captain C. O. SHERRILL, Corps of Engineers, U.S.A. 8vo. (Presented.) (Ketcheson Printing Co.) Kansas, 1909.

Ueber Himmelsbeobachtungen in Militärischer Beleuchtung. By Captain W. STAVENHAGEN. Crown 8vo. (Presented.) (Treptow-Sternwarte.) Berlin, 1909.

RECENT PUBLICATIONS OF MILITARY INTEREST.

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PREFATORY NOTE.

This Pamphlet will be issued quarterly, in April, July, October and January. Its purpose is to draw the attention of Officers to British and Foreign publications of Military interest which are likely to assist them in their professional work. Copies of the pamphlet will be distributed to the Headquarters of Commands, Educational Establishments, Units and Reference Libraries.

PART II.

SECTION II.

MAGAZINE ARTICLES.

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AERIAL NAVIGATION.

Flying Machines. M.W.B. (I.), No. 24, p. 529.
The Military Importance of Aeroplanes. I.R. Supp., 120, p. 119.
The Aero Exhibition. E., 26th March.
On the Action of Sails and Aeroplanes. E., 26th March.
Fifty Horse-Power Seven Cylinder Gnome Aero-motor. E., 26th March.
Reconnaissance from Captive Balloons. By Lieut. H. Chaumont. R.d'A., December.
Aeroplanes. By Lieuts. W. Beatty and A. Martin. R.E.J., April.
The Aerial Peril. By Captain T. G. Tulloch. N.C., May.
Aerial Flight. E., April 30th.
The Construction of Guns for use against Balloons. P.R.A.I., April.
Aero-motors. E., April 16th.
Military Kites (26 diagrams) (to be continued). Captain T. Th. Saconney. R. du G., February, March.
Progress in Airship and Aeroplane Construction in various Foreign Countries. O.M.Z., April.
How we Conquered the Air. By Wilbur and Orville Wright (translation by Major Ferrus). R.d'A., January.
Aerial Flight. E., May 14th.
Firing at Captive Balloons. By Lieut.-General Rohne. A.M.B. (I.), p. 266.
The Use of Airships in War. By Lord Montague of Beaulieu. N.D., June.
The Military Employment of Dirigible Balloons and Aeroplanes. (Mainly compiled from articles in the *Ruskii Invalid.*) M.A.G., May.
Progress in Aerial Navigation up-to-date. (Lecture by the Chief of the Russian Aeronautical Establishment.) M.A.G., May.
Notes from various Countries regarding Airships, Automobile Service, and Wireless Telegraphy. O.M.Z., May.
The Difficulty of Aerial Attack. By Major Sir A. Bannerman. J.U.S.I., May.
Defence of Harbours against Naval Airships. By Colonel F. G. Stone. J.U.S.I., May.

ARTILLERY.

A New Target Indicator. By Lieut. A. G. Leach. P.R.A.I., March.
The Field Gun of 1908. By Colonel H. A. Bethell. P.R.A.I., March.
Fire with High Explosive Shell against Shielded Guns. Translated from R.A.G., by Lieutenant J. R. Little. P.R.A.I., March.
Modern Artillery Tactics. By Lieut.-General von H. Rohne. A.M.B. (I.), February, p. 81.
Mechanical Time Fuzes. By P. Helwich. A.M.B. (I.), February, March.
The Italian Field Artillery in Case of War. M.W.B. No. 32 (I.), p. 713.
The Organization of the French and German Field Artillery. By Lieut.-General von Rohne. J.D.A.M., March, p. 244.
Technical Points for Field Artillery in Rear-guard Actions. M.W.B. No. 33, p. 732.
Field Artllery Fire over Cover lying in Front of the Battery. M.W.B. (I.) No. 36, p. 805.
The Krupp Independent Line of Sight. A.M.B. (I.), March, p. 222.
The Krupp Automatic Guns. A.M.B. (I.), March, p. 237.

Preparations for Opening Fire with Field Artillery. By Lieut.-General von Rohne. A.M.B. (I.), March, p. 212.

The 3-gun Battery. The Artillery of the Advanced Guard. By Captain Sorb. J.S.M., 1st, 15th March, 1st, 15th May.

Indirect Fire. A Periscope for Field Artillery (with seven diagrams). By Colonel Rouquerol. J.S.M., 15th March.

The Re-organization of the French Artillery. Report of a Special Com mission (to be continued). R.d'A., December, January.

The *Rôle* of Heavy Artillery: Its Employment in the Field, and its consequent Position on the March. By Major P. de S. Burney, P.U.S.I., April.

A New System of Fire Control for R.F. Guns, and a Proposed Scheme of Night Firing for all Coast Artillery Guns. By Lieutenant Halsey Dunwoody. U.S.A., March-April.

The Communications of a Field Artillery Brigade. By Lieutenant J. A. Dane. P.R.A.I., April.

A much-needed Reform in the Royal Artillery. By Major H. de T. Phillips. P.R.A.I., April.

The Selection and Training of the *Personnel* required in a Field Artillery Brigade for purposes of Communication in the Field. By Lieutenant J. C. Dundas. P.R.A.I., April.

The Construction of Guns for use against Balloons. P.R.A.I., April.

Improvement in Construction of Fuzes. Latest Patterns made by different Firms (continued). M.A.G., April.

Experiences of recent Wars regarding the Employment of Field Artillery (to be continued). By Major Seeger. J.D.A.M., February.

The Question of our Field Artillery Teams: Parliamentary Debate on this Subject. Colonel Marais. J.S.M., 1st April.

The Future of our Home Army Organization. By Colonel H. C. Simpson. P.R.A.I., May.

Artillery from an Infantry Point of View. By Lieut.-Colonel J. H. Crowe. P.R.A.I., May.

Engaging Rapid Targets with Q.F. Guns. By Lieutenant G. N. Walford. P.R.A.I., May.

Artillery in Battles of Encounter. A.M.B. (I.), p. 249.

Firing at Captive Balloons. By Lieut.-General Rohne. A.M.B. (I.), p. 266.

Modern Field Artillery. By Lieut.-General Rohne. A.M.B. (I.), p. 266.

Remarks on Foot Artillery (Coast Defence Guns). By Captain J. Berger. A.M.B. (I.), p. 291.

Resistance to the Close Attack of Infantry by Artillery in Covered Positions. M.W.B. (I.), No. 63, p. 1434.

The Organization and Employment of Field Howitzers. By von Beckmann (Instructor at the Military Technical Academy). J.D.A.M. (I.), p. 473.

The Co-operation of Field and Heavy Artillery. By Major-General Richter. A.M.B. (I.), p. 321.

The Life of Heavy Guns. By Lieut.-General Rohne. A.M.B. (I.), p. 338.

Improvements in the Construction of Carriages for Field and Mountain Guns. M.A.G., May.

The "Life" of Heavy Calibre Guns. M.A.G., May.

Reply from the Artillery school at Hajmasker to some previous Comments regarding indirect Firing and Concealed Positions. O.M.Z., May.

The New German Field Artillery *Matériel*, Mark 96 n/A. By Captain F. Jung. R.d'A., February.

Re-organisation of the French Artillery. R.d'A., February.

The Field Artillery *Matériel* of European Countries. R.d'A., February.

Defence of Harbours against Naval Airships. By Colonel F. G. Stone. J.U.S.I., May.

Artillery Fire in Land Fortresses. By V. Krishtafovich. A.J., March.

CAVALRY.

The French Cavalry. By Lieut.-Colonel H. C. Lowther. C.J., April.

Collection and Treatment of Wounded Cavalry. By Lieut.-Colonel Macpherson. C.J., April.

Organization of the Strategical Cavalry. Communicated by the General Staff. C.J., April.

Training of Yeomanry as Divisional Cavalry. By a Yeomanry Officer. C.J., April.

Some Notes, Some Notions, and a Tackle for the early Handling of Troublesome Australian Remounts. By Captain R. W. Grimshaw. C.J., April.

Diet and Feeding of the Horse. By Dr. C. Chomel. L.S.M., 1st March.

General Geslin de Bourgogne. Editorial. R.C., February.

Brigade, Divisional and Squadron Training. (1 map and 3 diagrams.) L'Irrégulier. (Concluded.) R.C., February.

Our Cavalry in the next War. By General von Bernhardi (translation from German by P.S.), (Continued.) R.C., February, March.

Letters of a Dragoon to the Members of the Army Commission. (Concluded.) R.C., February.

The Dismounted Action of Cavalry. By Jean d'Epée. J.S.M., 1st April.

Cavalry and Cyclists. By Captain Guédeney. R.C., March.

Seydlitz. Editorial. (Continued.) R.C., March.

Cavalry in the Russo-Japanese War. By Commandant Dixon. R.M.G., April.

French Views on the Training of Cavalry with a two years' Term of Service. K.M., March.

Cavalry Raids. K.M., March.

The New Austrian Cavalry Sword. K.M., March.

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Physical Training and the Medical Profession. By Surgeon K. D. Bell. J.R.A.M., June.

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SECTION III.

BOOKS, PAMPHLETS, ETC., WHICH HAVE BEEN DISTRIBUTED TO REFERENCE LIBRARIES.

Report on a Cavalry Staff Ride held by the Director of Staff Duties, March, 1909.

Report on a Staff Tour held by the Chief of the General Staff, October, 1908.

Report on the Army Qualifying Examination held in March, 1909.

Report on the Competitive Examination for Commissions in the Regular Army held in March, 1909.

Field Service Manual, Medical (India).

Field Service Manual, Heavy Batteries R.G.A. and their Ammunition Columns (India).

Field Service Regulations, Chapter XIX. (India).

The Imperial General Staff.

ABBREVIATIONS.

Abbreviation.	Name of Newspaper or Periodical.		Price.	Place of Publication.
A.F.	Bulletin du Comité de l'Afrique française	M.	2 frs.	Paris.
A.F.H.	Archiv für Schiffs- und Tropen-Hygiene	½ M.	*	Leipzig.
A.H.M.	Annales d'hygiène et de médecine coloniale	M.	3 frs.	Paris.
A.J.	Artilleriskii Jurnal	M.	*	St. Petersburg.
A.M.B.	Artilleristische Monatshefte	M.	m. 2.50	Berlin.
A.M.P.	Archives de médecine et de pharmacie militaires	M.	2 frs.	Paris.
A.M.S.	Proceedings of the Aldershot Military Society	...	/6	London.
A.N.R.	Army and Navy Register	W.	15 c.	Washington.
A.Q.R.	Imperial and Asiatic Quarterly Review	Q.	2/6	Woking.
A.S.C.	Army Service Corps Quarterly	Q.	2/-	Aldershot.
A.S.M.	Allgemeine schweizerische Militärzeitung	W.	*	Basle.
B.Mag.	Blackwood's Magazine	M.	2/6	Edinburgh.
B.M.J.	British Medical Journal	W.	/6	London.
B.P.B.M.	Bulletin de la Presse et de la Bibliographie militaires. (Supplement to J.M.O.B.)	F.	*	Brussels.
B.S.C.	Bulletin international des sociétés de la croix rouge	M.	50 c.	Geneva.
C.J.	Cavalry Journal	Q.	2/6	London.
C. Mag.	Canadian Magazine	M.	25 c.	Toronto.
C.M.G.	Canadian Military Gazette	F.	10 c.	Montreal.
C.O.J.	Colonial Office Journal	Q.	1/6	London.
Con.	Der Continent	M.	m. 1.25	Berlin.
C.R.	Contemporary Review	M.	2/6	London.
D.M.S.	De militaire Spectator	M.	1 fr. 50	Haarlem.
D.M.Z.	Deutsche militärärztliche Zeitschrift	½ M.	*	Berlin.
E.	Engineering	W.	/6	London.
Ec.	Economist	W.	/8	London.
Emp. R.	Empire Review	M.	1/-	London.
E.R.	Edinburgh Review	Q.	6/-	London.
F.M.F.	Feuille militaire Fédérale	V.	40 c.	Berne.
F. Rev.	Fortnightly Review	M.	2/6	London.
I.J.	Intendanski Jurnal	M.	*	St. Petersburg.
I.M.T.	Indisch Militair Tijdschrift	M.	1 fr. 50	Batavia.
Inj.	Injeniernii Jurnal	M.	*	St. Petersburg.
I.R.	Internationale Revue (Armeen und Flotten)	M.	m. 3.25	Dresden.
J.A.M.S.	The Military Surgeon. Journal of the Assoc. of Military Surgeons	M.	35 c.	Carlisle, Penn.
J.A.S.	Journal of the African Society	Q.	6/-	London.
J.D.A.M.	Jahrbücher für die Deutsche Armee und Marine	M.	m. 2.50	Berlin.
J.M.O.B.	Journal militaire Officiel	M.	*	Brussels.
J.M.S.I.	Journal of the Military Service Institution	2 M.	50 c.	Governor's Island, N. York
J.M.S.S.	Journal of the Military Scientific Society (Russian)	Q.	1 Ro. 50kop.	St. Petersburg.
J.R.A.M.	Journal of the Royal Army Medical Corps	M.	2/-	London.
J.R.C.I.	Journal of the Royal Colonial Institute	M.	/6	London.
J.S.M.	Journal des Sciences militaires	M.	*	Paris.
J.U.S.I.	Journal of the Royal United Service Institution	M.	2/-	London.

W., published weekly; F., fortnightly; M., monthly; Q., quarterly; V., at irregular intervals; A., annually.

* Periodicals which can only be purchased by subscription.

ABBREVIATIONS.—contd.

Abbreviation.	Name of Newspaper or Periodical.		Price.	Place of Publication.
J.U.S.I. (N.S.W.)	Journal of the United Service Institution of New South Wales	A.	*	Sydney.
K.M. ...	Kavalleristische Monatshefte	M.	k. 2.	Vienna.
K.T.Z. ..	Kriegstechnische Zeitschrift	M.	m.1.50	Berlin.
L.... ...	Lancet	W.	-/7	London.
L.A.F. ...	Comité de l'Asie française, Bulletin ...	M.	2.25frs	Paris.
L.B.M. ...	La Belgique militaire	W.	25 c.	Brussels.
L.R.I. ...	La Revue d'Infanterie	M.	2 frs.	Paris.
L.S.M. ...	Le Spectateur militaire	F.	2 frs.	Paris.
M.A.G. ...	Mittn. über Gegenstände des Art.- u. Genie-Wesens	M.	*	Vienna.
M. Art. ...	Memorial de Artillería	M.	*	Madrid
M.C. ...	McClure's Magazine	M.	25 c.	New York.
M.I.E. ...	Memorial de ingenieros del ejército ...	M.	*	Madrid.
M.R. ...	Marine-Rundschau	M.	m. 2.	Berlin.
M.W.B. ...	Militär-Wöchenblatt	½W.	20 pf.	Berlin.
N.C. ...	Nineteenth Century	M.	2/6	London.
N.D. ...	National Defence	M.	1/-	London.
N.I.A. ...	Nation in Arms	M.	/3	London.
N.M.B. ...	Neue Militärische Blätter	W.	60 pf.	Berlin.
N.R. ...	National Review	M.	2/6	London.
O.M.Z. ...	Streffleurs militärische Zeitschrift, zugleich Organ der militär-wissenschaftlichen Vereine	M.	*	Vienna.
P.J. ...	Preussische Jahrbücher	M.	m.2.50	Berlin.
P.R.A.I. ...	Journal of the Royal Artillery	M.	2/6	Woolwich.
P.U.S.I. ...	Journal of the United Service Institution of India	Q.	2 Rs.	Simla.
Q.D. .	Questions diplomatiques et coloniales...	F.	75 c.	Paris.
Q.R. ...	Quarterly Review...	Q.	6/-	London.
R.A.G. ...	Rivista di Artiglieria e Genio	M.	*	Rome.
R.C. ...	Revue de Cavalerie	M.	*	Paris.
R. d'A. ...	Revue d'Artillerie...	M.	*	Paris.
R.D.D.M.	Revue des Deux Mondes...	½M.	3 frs.	Paris.
R. du G....	Revue du Génie militaire	M.	2.50fr.	Paris.
R.E.J. ..	Royal Engineers' Journal	M.	1/6	Chatham.
R.I.C. ...	Revue Indo-Chinoise	F.	1.50frs	Hanoi.
R.I.M. ...	Revue du service de l'intendance militaire	M.	2 frs.	Paris.
R.H. ...	Revue d'Histoire	M.	2 frs.	Paris.
R.M.B. ...	Revue de l'Armée belge	2 M	*	Liège
R.M.E. ...	Revue militaire des Armées étrangères	M.	1 fr.	Paris.
R.M.G. ...	Revue militaire générale	M.	2.50 fr.	Paris.
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R.M.L. ...	Revista militar	F.	200 reis.	Lisbon.
R.M.S. ...	Revue militaire suisse	M.	*	Lucerne.
R.T.C. ...	Revue des Troupes Coloniales	M.	2 frs.	Paris.
S.G.R. ...	Saint George's Review	M.	1/-	London.
S.Z.A.G. ...	Schweizerische Zeitschrift für Artillerie und Genie	M.	*	Frauenfeld.
U.S.A. ...	United States Artillery Journal... ...	2 M.	50 c.	Fort Monroe
U.S.C. ...	United States Cavalry Association Journal	Q.	50 c.	Fort Leavenworth
U.S.I. ...	United States Infantry Association Journal	Q.	50 c.	Washington.
U.S.M. ...	United Service Magazine (Colburn's) ...	M.	2/-	London.
V.R.K. ..	Vyestnik Ruskoi Konnitsi	F.	*	St. Petersburg.
V.S. ...	Voyennii Sbornik (Military Journal) ...	M.	*	St. Petersburg
V.T.H. ...	Vierteljahrshefte für Truppenführung und Heereskunde	Q.	*	Berlin.

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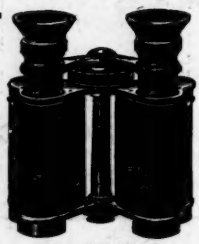

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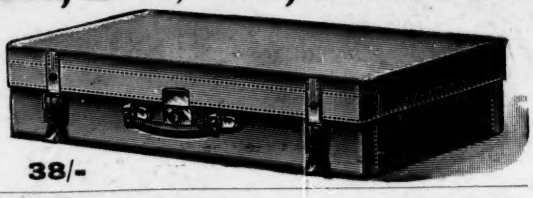

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,, B. J. Haslam, Royal Engineers.
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,, R. G. Wace, Royal Engineers.
,, G. M. James, East Kent Regiment.
,, N. R. Swan, Yorkshire Regiment.
Lieut. E. S. Chance, Royal Welsh Fusiliers.
Capt. D. S. Gillson, Scottish Rifles.
,, H. R. M. Brooke-Popham, Oxfordshire Light Infantry.
,, J. T. Weatherby, Oxfordshire Light Infantry.
,, A. G. Macdonald, Royal Berks Regiment.
,, E. F. Trew, Royal Marine Light Infantry.
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Capt. E. Fitz G. Dillon, Royal Munster Fusiliers.
,, J. B. Jenkinson, Rifle Brigade.
,, D. C. Cameron, Army Service Corps.
,, W. F. C. Gilchrist, Indian Army.
,, C. L. Peart, Indian Army.
,, C. W. A. Holmes, Indian Army.

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,, H. M. Durand, 9th Lancers.
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SEVEN PASSED.

PROMOTION (MAY).

FORTY-THREE PASSED.

WORK NOW GOING ON IN ALL DEPARTMENTS.

For Prospectus, apply the Secretary.

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